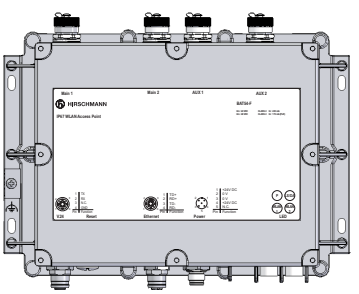
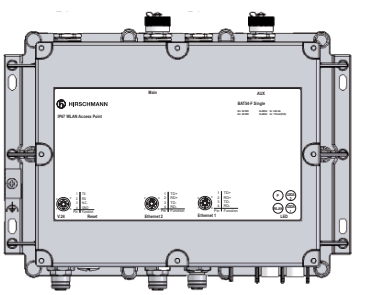
HIRSCHMANN
A BELDEN BRAND

User Manual

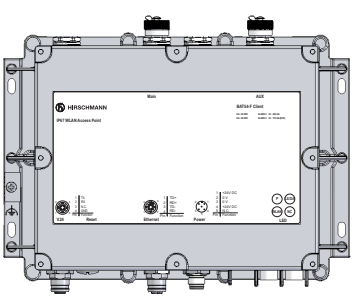
Installation
Dual-Band Industrial Access Point / Client / Access Bridge
BAT Family



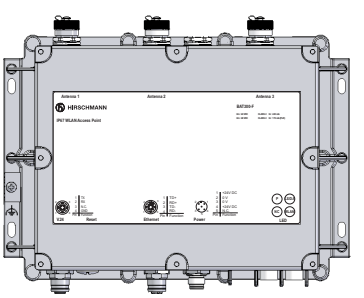
BAT54-F



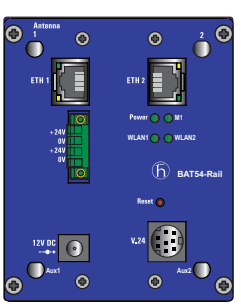
BAT54-F Single



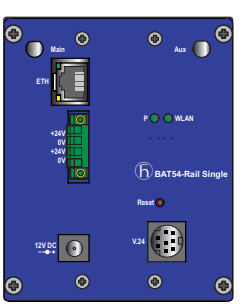
BAT54-F Client



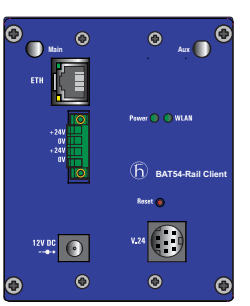
BAT300-F



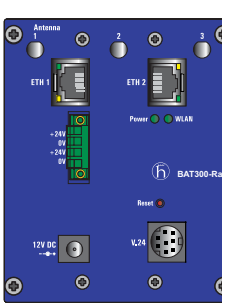
BAT54-Rail



BAT54-Rail Single



BAT54-Rail Client



BAT300-Rail

03972600203081000

Technical Support
HAC.Support@Belden.com

The naming of copyrighted trademarks in this manual, even when not specially indicated, should not be taken to mean that these names may be considered as free in the sense of the trademark and tradename protection law and hence that they may be freely used by anyone.

© 2010 Hirschmann Automation and Control GmbH

Manuals and software are protected by copyright. All rights reserved. The copying, reproduction, translation, conversion into any electronic medium or machine scannable form is not permitted, either in whole or in part. An exception is the preparation of a backup copy of the software for your own use. For devices with embedded software, the end-user license agreement on the enclosed CD applies.

The performance features described here are binding only if they have been expressly agreed when the contract was made. This document was produced by Hirschmann Automation and Control GmbH according to the best of the company's knowledge. Hirschmann reserves the right to change the contents of this document without prior notice. Hirschmann can give no guarantee in respect of the correctness or accuracy of the information in this document.

Hirschmann can accept no responsibility for damages, resulting from the use of the network components or the associated operating software. In addition, we refer to the conditions of use specified in the license contract.

You can get the latest version of this manual on the Internet at the Hirschmann product site (www.beldensolutions.com).

Printed in Germany
Hirschmann Automation and Control GmbH
Stuttgarter Str. 45-51
72654 Neckartenzlingen
Germany
Tel.: +49 1805 141538

Contents

Safety instructions 5

About this manual 13

1 Device description 14

1.1 Properties and functions 14
1.1.1 BAT-F types 15
1.1.2 BAT-Rail types 15
1.1.3 BAT54 types 15
1.1.4 BAT300 types 16
1.1.5 BAT-BG/BGN types 16
1.1.6 Other features 16

1.2 Interfaces and control elements 19
1.2.1 BAT54-F 19
1.2.2 BAT54-F Single 20
1.2.3 BAT54-F Client 21
1.2.4 BAT300-F 22
1.2.5 BAT54-Rail 23
1.2.6 BAT54-Rail Single 24
1.2.7 BAT54-Rail Client 25
1.2.8 BAT300-Rail 26

1.3 Device models 27
1.3.1 BAT54-F devices 27
1.3.2 BAT54-Rail devices 28
1.3.3 BAT300-F devices 28
1.3.4 BAT300-Rail devices 28
1.3.5 BAT-BG/BGN devices 29

2 Assembly and start-up 30

2.1 Installing the device 30

2.2 Unpacking and checking 30

2.3 Putting components together (BAT-F) 31

2.4 Selecting the location for mounting/ setting up 31

2.5 Mounting outdoors (BAT-F) 31
2.5.1 Lightning protection 31
2.5.2 Pole mounting 33

2.6 DIN rail mounting (BAT-Rail) 33

2.7 Flat surface mounting 34
2.7.1 BAT-F 34

2.7.2 BAT-Rail 35

2.8 Mounting/connecting external antennas 35
2.8.1 Connections for external antennas on BAT-F 35
2.8.2 Connections for external antennas on BAT-Rail 38
2.8.3 Mounting external antennas 40

2.9 Connecting LAN and WLAN connectors 40
2.9.1 BAT-F 40
2.9.2 BAT-Rail 40

2.10 Grounding 41
2.10.1 BAT-F 41
2.10.2 BAT-Rail 41

2.11 Connecting the supply voltage 42
2.11.1 5-pin M12 connector (BAT-F) 42
2.11.2 4-pin terminal block (BAT-Rail) 42
2.11.3 Power over Ethernet (PoE) - power supply via the LAN cable 43

2.12 Connecting the data lines 44
2.12.1 10/100 Mbit/s twisted pair connection 44
2.12.2 10/100 Mbit/s twisted pair connection 45

2.13 Installing the BAT-F X2 housing cover 46

2.14 Startup procedure 47
2.14.1 BAT-F 47
2.14.2 BAT-Rail 47

2.15 Configuring devices 48

2.16 Installing external antennas 48

2.17 Display elements 50

2.18 Operation element (reset button) 53
2.18.1 Functions 53
2.18.2 BAT-F 53
2.18.3 BAT-Rail 54

2.19 Basic set-up 54

2.20 Disassembly 56

3 Technical data 57

A Further Support 64

Safety instructions

Notes on safety

This manual contains instructions to be observed for ensuring your personal safety and for preventing damage. The warnings appear next to a warning triangle with a different heading depending on the degree of danger posed:

Danger!
Means that death, serious physical injury or significant damage to property **will occur** if the corresponding safety measures are not carried out.

Warning!
Means that death, serious physical injury or significant damage to property **could occur** if the corresponding safety measures are not carried out.

Caution!
Means that minor physical injury or damage to property can occur if the required safety measures are not carried out.

Note: Contains important information on the product, on how to manage the product, or on the respective section of the documentation to which your special attention is being drawn.

Certified usage

The device may only be employed for the purposes described in the catalog and technical description, and only in conjunction with external devices and components recommended or approved by the manufacturer. The product can only be operated correctly and safely if it is transported, stored, installed and assembled properly and correctly. Furthermore, it must be operated and serviced carefully.

Supply voltage

The devices are designed for operation with extra-low voltage (SELV). Accordingly, SELV circuits with voltage restrictions in accordance with IEC/EN 60950-1 may be connected to the supply voltage connectors. The supply voltage is electrically isolated from the housing.

- ☐ Use undamaged parts.
- ☐ For BAT300-Rail: Make sure that the DC power supply line has a maximum length of 3 meters.

☐ Relevant for North America: For use in Class 2 circuits. Only use copper wire/conductors of class 1, 75 °C or 90 °C (167 °F or 194 °F).
☐ Relevant for North America: For use in Class 2 circuits.
The device may only be connected to a supply voltage of class 2 that fulfills the requirements of the National Electrical Code, Table 11(b). If the voltage is being supplied redundantly (two different voltage sources), the combined supply voltages must fulfill the requirements of the National Electrical Code, Table 11(b).
☐ Relevant for North America:
Adapters for BAT-F types providing field wiring means you obtain from the manufacturer. For field wiring, use a type E12AAA5A1A power supply cable, manufacured by Belden.

Shielding ground

The shield of the connectable twisted pair cables is connected to the metal casing of the device as a conductor.
☐ Beware of possible short circuits when connecting a cable section with conductive shielding braiding.

Housing

Only technicians authorized by the manufacturer are permitted to open the housing.
☐ Make sure that the electrical installation meets local or nationally applicable safety regulations.

Warning!
Never insert sharp objects (small screwdrivers, wires, etc.) into the inside of the product. There is the risk of an electric shock.

BAT-F types:
A separate screw connector on the housing is provided for the functional ground (FE). This is indicated by the functional ground symbol (⏚). The functional ground is electrically connected to the switching ground and the metal housing of the device.

BAT-Rail types:
The lower panel of the device housing is grounded by means of the DIN rail.
☐ If installed in a living area or office environment, the device must be operated exclusively in switch cabinets with fire protection characteristics according to EN 60950-1.

Environment

The device may only be operated at the specified surrounding air temperature (temperature of the ambient air at a distance of up to 5 cm (1.97 in) from the device) and relative air humidity specified in the technical data.

☐ Install the device in a location where the climatic threshold values specified in the technical data will be observed.

Important: Relevant for BAT-F types:
Environmental Rating: Type 1 - indoor use only.
For use in NFPA 79 applications only.

☐ When installing external antennas, adhere to the regulations of the country in which you are operating the WLAN device.
☐ In ambient temperatures under -10 °C, use cabling designed for minimum temperatures.

Relevant for use in Ex zone 2 according to ATEX 95 (ATEX 100a):
Only products labeled accordingly may be operated in Ex zone 2.
When operating the BAT-300F X2 types in Ex zone 2, the following applies:

II 3G
Ex nA II T4 -20 °C ... +55 °C
KEMA 10 ATEX 0124 X

Temperature Code T4	Ambient -20 °C … +55 °C
List of Standards	EN 60079-0: 2006
	EN 60079-15: 2005
	CLC/TR 50427: Dez. 2004

When operating the BAT-54F X2 types in Ex zone 2, the following applies:

II 3G
Ex nA II T4 -20 °C ... +60 °C
KEMA 07 ATEX 0124 X

Temperature Code T4	Ambient -20 °C … +60 °C
List of Standards	EN 60079-0: 2006
	EN 60079-15: 2005
	CLC/TR 50427: Dez. 2004

DO NOT OPEN THE DEVICE WHEN IT IS ELECTRICALLY CHARGED.
DO NOT DETACH ANY CONNECTORS WHEN THE DEVICE IS ELECTRICALLY CHARGED.
DO NOT REMOVE THE LABELED HOUSING COVER.

☐ The BAT-F X2 (FCC) types are installed with a housing cover - as mounted in the state on delivery.

Special conditions for safe use

☐ Provisions shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 40 %.

☐ When the temperature under rated conditions exceeds 70 °C at the cable or conduit entry point, or 80 °C at the branching point of the conductors, the temperature specification of the selected cable shall be in compliance with the actual measured temperature values.

Lightning protection

When you mount devices and / or antennas outdoors, there is a risk of them being struck by lightning. Additionally, there is the risk of voltage surges being transmitted into the interior of the building. It is your responsibility to take appropriate measures to mitigate the effects of lightning strikes. Make sure the equipment is installed by a licensed electrician in accordance with local, regional and national regulations for codes and standards (such as VDE 0182 and IEC 62305) and according to best practices for your application and environment.

Warning
When you mount devices outside buildings, there is a risk of them being struck by lightning. Additionally, there is the danger of voltage strikes being transmitted into the interior of the building.

☐ See the information in the “WLAN Outdoor Guide”, chapter “Lightning and Surge Voltage Protection”.

☐ Make sure that your plant designer or installer has carried out suitable lightning prevention measures.

Qualification requirements for personnel

Qualified personnel as understood in this manual and the warning signs, are persons who are familiar with the setup, assembly, startup, and operation of this product and are appropriately qualified for their job. This includes, for example, those persons who have been:

▶ trained or directed or authorized to switch on and off, to ground and to label power circuits and devices or systems in accordance with current safety engineering standards;

- trained or directed in the care and use of appropriate safety equipment in accordance with the current standards of safety engineering;
- trained in providing first aid.

General safety instructions

Electricity is used to operate this equipment. Comply with every detail of the safety requirements specified in the operating instructions regarding the voltages to apply (see page 5).

Non-observance of these safety instructions can therefore cause material damage and/or serious injuries.

- ☐ Only appropriately qualified personnel should work on this device or in its vicinity. These personnel must be thoroughly familiar with all the warnings and maintenance procedures in accordance with this operating manual.
- ☐ The proper and safe operation of this device depends on proper handling during transport, proper storage and assembly, and conscientious operation and maintenance procedures.
- ☐ Never start operation with damaged components.
- ☐ Only use the devices in accordance with this manual. In particular, observe all warnings and safety-related information.
- ☐ Any work that may be required on the electrical installation may only be carried out by personnel trained for this purpose.

National and international safety regulations

- ☐ Make sure that the electrical installation meets local or nationally applicable safety regulations.
- ☐ When installing external antennas, adhere to the regulations of the country in which you are operating the WLAN device.

CE marking

The devices comply with the regulations contained in the following European directive:

1999/5/EC
Directive of the European Parliament and the council for radio installations and telecommunication systems and for the mutual recognition of their conformity.

This directive also contains the goals of directive 2004/108/EC of the European Parliament and the council for standardizing the regulations of member states relating to electromagnetic compatibility, and directive 2006/95/EC of the European Parliament and the council for standardizing the regulations of member states relating to electrical equipment to be used within specific voltage ranges, but without applying the lower voltage threshold.

CE This product may be operated in all EU states (EU = European Union) under the condition that it has been configured correctly.

In accordance with the above-named EC directive (EC = European Community), the EC conformity declaration will be at the disposal of the relevant authorities at the following address:

Hirschmann Automation and Control GmbH
Stuttgarter Str. 45-51
72654 Neckartenzlingen
Tel.: +49 1805 141538

This product can be used in living areas (living area, place of business, small business) and in industrial areas.

Information on using devices in motor vehicles (e1)

Some variants of the devices are e1-certified. Only operate suitably labeled products in motor vehicles.

Note: To meet the requirements of directive 1999/5/EG (R&TTE directive) when operating the device in a motor vehicle, do one of the following:

- Supply the power to the device via a Power over Ethernet (PoE) Switch or via a power unit that conforms to IEEE 802.3af.
  You will find information on PoE-compatible Switches from Hirschmann at www.beldensolutions.com
- Install an upstream filter on the 24V DC power supply. You will find information on suitable filters at www.beldensolutions.com.

Note: If you are using an e1-certified device in a vehicle and want to be able to drive the vehicle freely within the EU, set the country profile for Germany. This country profile is identical to all the country profiles for EU countries. Do not, however, use any special frequencies, such as BFWA.

FCC note:

This device complies with part 15 of the FCC rules.
Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- ☐ Reorient or relocate the receiving antenna.
- ☐ Increase the separation between the equipment and receiver.
- ☐ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- ☐ Consult the dealer or an experienced radio/TV technician for help.

Important note:
This equipment complies with FCC and IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 40 cm (15.8 in, applied to a 23 dBi antenna) between the radiator and your body.

The antenna used for this transmitter must not be co-located with any other transmitters within a host device, except in accordance with FCC multi-transmitter product procedures.

This transmitter is restricted to indoor use only within the 5.15-5.25 GHz band to reduce potential for harmful interference to co-channel mobile satellite systems.

This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

This device has been designed to operate with the antennas listed below in point-to-multipoint systems, and having a maximum gain of 9 dBi:

Device model	Antennas operating with this device model
BAT54-… (FCC)	BAT-ANT-N-5A-IP65 BAT-ANT-N-6G-IP65 BAT-ANT-N-6ABG-IP65 BAT-ANT-N-8G-DS-IP65 BAT-ANT-N-9A-DS-IP65 BAT-ANT-N-LC-G-50m-IP65 BAT-ANT-N-LC-G-100m-IP65
BAT300-… (FCC)	BAT-ANT-N-8G-DS-IP65, BAT-ANT-N-9A-DS-IP65, BAT-ANT-N-MiMoDB-5N-IP65, BAT-ANT-N-MiMo5-9N-IP65

Table 1: Antennas for use in point-to-multipoint systems

The antennas listed below have been designed for use exclusively in fixed point-to-point systems operating in the 2400-2483 MHz and the 5725-5850 MHz band and having a maximum gain of 23 dBi:

Device model	Antennas operating with this device model
BAT54-… (FCC)	BAT-ANT-N-14G-IP23
BAT300-… (FCC)	BAT-ANT-N-23A-VH-IP65

Table 2: Antennas for use in fixed point-to-point systems

Antennas not included in this list are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

Recycling note

After usage, this product must be disposed of properly as electronic waste, in accordance with the current disposal regulations of your county, state and country.

About this manual

The following manuals are available as PDF files on the CD-ROM supplied:

- "Installation" user manual
- Reference Manual

Legend

The symbols used in this manual have the following meanings:

▶	Listing
☐	Work step
■	Subheading

1 Device description

1.1 Properties and functions

The devices of the BAT family enable you to set up WLANs (Wireless Local Area Networks) in order to connect individual devices (PCs and mobile computers) with a local network. In contrast to a conventional network connection via copper cables and glass fibers, some of the communication is by means of a radio link.

The devices of the BAT family can be used for both new installations and for expanding an existing LAN. Thanks to their high level of flexibility, you can combine large, small, mobile and non-mobile locations. Anywhere that high bandwidths, stable operation and network security are required, wireless LAN with the devices of the BAT family provides the ideal solution.

The BAT54-F is an access point/client with a WLAN interface for dualband operation in accordance with IEEE 802.11b/g and IEEE 802.11a/h, and it is specially designed for outdoor use with protection class IP67. The BAT54-F can be installed quickly and easily using wizards via the Windows configuration software or the Web interface. The wide range of BAT antennas provide the correct solution for every requirement - even out-of-the-box solutions.

The devices are designed for the special requirements of industrial automation. They are suitable for outdoor use and in environments with the danger of explosions. They meet the relevant industry standards, provide very high operational reliability, even under extreme conditions, and also long-term reliability and flexibility. The devices operate without fans and have a redundant voltage supply. You can mount the devices on a pole or on a flat surface (e.g. wall).

The devices differ with regard to their design, the standards they support and their certifications, as shown in the table below:

		Design		
		Indoor BAT-Rail types	**Outdoor** BAT-F types	
Radio standards	**802.11 a/b/g/h/i** BAT54 types			Ex range BAT X2 types
		BAT54-Rail BAT54-Rail-Client BAT54-Rail Single	BAT54-F BAT54-F Single BAT54-F Client	BAT54-F X2 BAT54-F Single X2 BAT54-F Client X2
	802.11 a/b/g/h/i/n BAT300 types	BAT300-Rail	BAT300-F	BAT300-F X2

Table 3: Range of applications for BAT device types

1.1.1 BAT-F types

The BAT-F devices have protection class IP67. The devices are particularly suitable for field use. You can mount the devices on a pole or on a flat surface (e.g. wall).

- **BAT-X2 types**
  BAT-X2 devices are suitable for use in environments with the danger of explosions (Ex zone 2 areas according to ATEX 95 / ATEX 100a).

1.1.2 BAT-Rail types

BAT-Rail devices are suitable for use on DIN rails and on machines in the production area, as well as on vehicles. You can snap them quickly and simply onto the DIN rail or mount them on a flat surface (e.g. wall). With 5-way redundant voltage supply (4-way for the BAT-Client) and a vibration-resistant metal housing, the devices provide high operational reliability.

1.1.3 BAT54 types

The BAT54 is a dual-band industrial wireless LAN access point/client with two independent WLAN modules in accordance with IEEE 802.11a/b/g/h and IEEE 802.11i. In particular, the devices support the security mechanisms, authentication procedures and data encryptions defined in the IEEE 802.11i standard.

1.1.4 BAT300 types

The BAT300 is a dual-band industrial high-performance wireless LAN access point/client in accordance with IEEE 802.11a/b/g/h and 802.11n. The devices provide a higher radio output with a bandwidth of up to 300 Mbit/s. They support MIMO (Multiple Input Multiple Output) and Multipath. The bandwidth is increased by using the multipath transmission by means of reflections. Three antennas for sending and receiving ensure more stable network coverage with fewer shadow areas (see following figure).

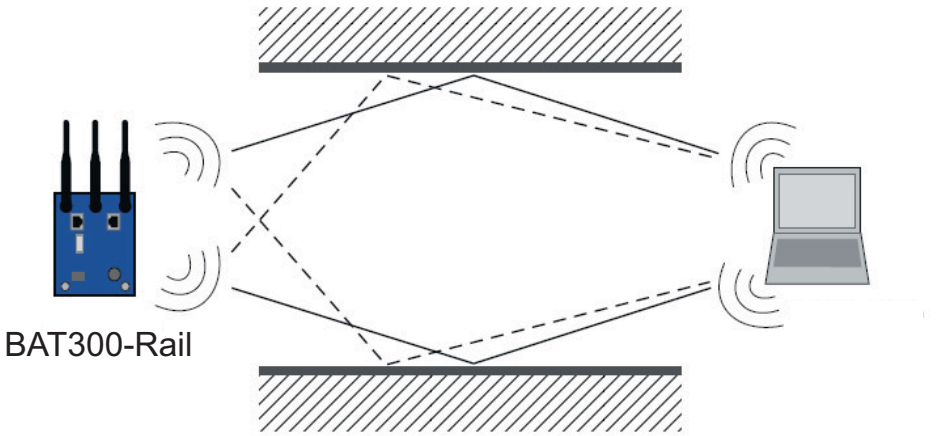


Figure 1: Schematic representation of MIMO (Multiple Input Multiple Output)

1.1.5 BAT-BG/BGN types

BAT-BG/BGN devices only support the use of the 2.4 GHz ISM wave band.

Note: Note that the function descriptions for the BAT-BG/BGN devices in this installation guide and in the user manuals for the devices only apply to operation with 2.4 GHz.
Hirschmann supports you by providing country profiles. These profiles help you to conform to the requirements of the country in which you are operating the WLAN installation.
Make sure you always set the correct country profile.

1.1.6 Other features

Features can be managed via a Web browser, via Telnet, with a management software product (such as ConneXview or LANconfig/ LANmonitor) or locally on the device (V.24 interface).
The devices provide high mobility combined with maximum security.

The devices provide you with a large range of features:

- Sturdy metal housing with protection class IP67 (BAT-F) or protection class IP40 (BAT-Rail)

- Secure mounting on a flat surface (e.g. wall), a pole (BAT-F) or a DIN rail (BAT-Rail)
- Redundant power supply with two 24 V supplies, Power over Ethernet, and one 12 V supply
- Temperature range –30 °C to +55 °C
- Wireless LAN interfaces in accordance with IEEE 802.11b/g and IEEE 802.11a/h or IEEE 802.11n
- Creation of redundant WLAN connections for secure data transmission
- Maximum security, also for point-to-point with encryption in accordance with the IEEE 802.11i standard
- RS-232 serial interface for configuration, remote access and the provision of a serial gateway
- Radio modules can be operated separately as an access point or client (apart from BAT-Client types)
- Fast and reliable roaming and prioritizing, also with IEEE 802.1x authentication
- High performance operating system with a wide range of functions via MultiSSID, VLAN, Rapid Spanning Tree, RADIUS server, IP router, firewall, DHCP server, etc.
- Management software for Windows, Web configuration, Telnet interface and management via SNMP

Antenna technology for a high quality signal

- For operation indoors and outdoors
- Mounting with cables provided
- Secure wall and pole bracket
- Optimized distribution and performance for every application
- Long transmission distances
- Designed for 2.4 GHz and 5 GHz wave bands

Cross-platform WLAN management

- A standardized, cross-platform management system for transparent and efficient network monitoring (SNMP)
- Windows management suite: LANconfig, LANmonitor, WLANmonitor
- Direct management via Web browser (HTTP, HTTPS)
- Command line level: TelNet
- Can always be reached via serial interface
- Complete and partial configuration of multiple devices via scripting
- WLANmonitor for convenient monitoring of WLANs with Rogue AP Detection
- Monitoring of all BAT family devices as clients and as access points in an application

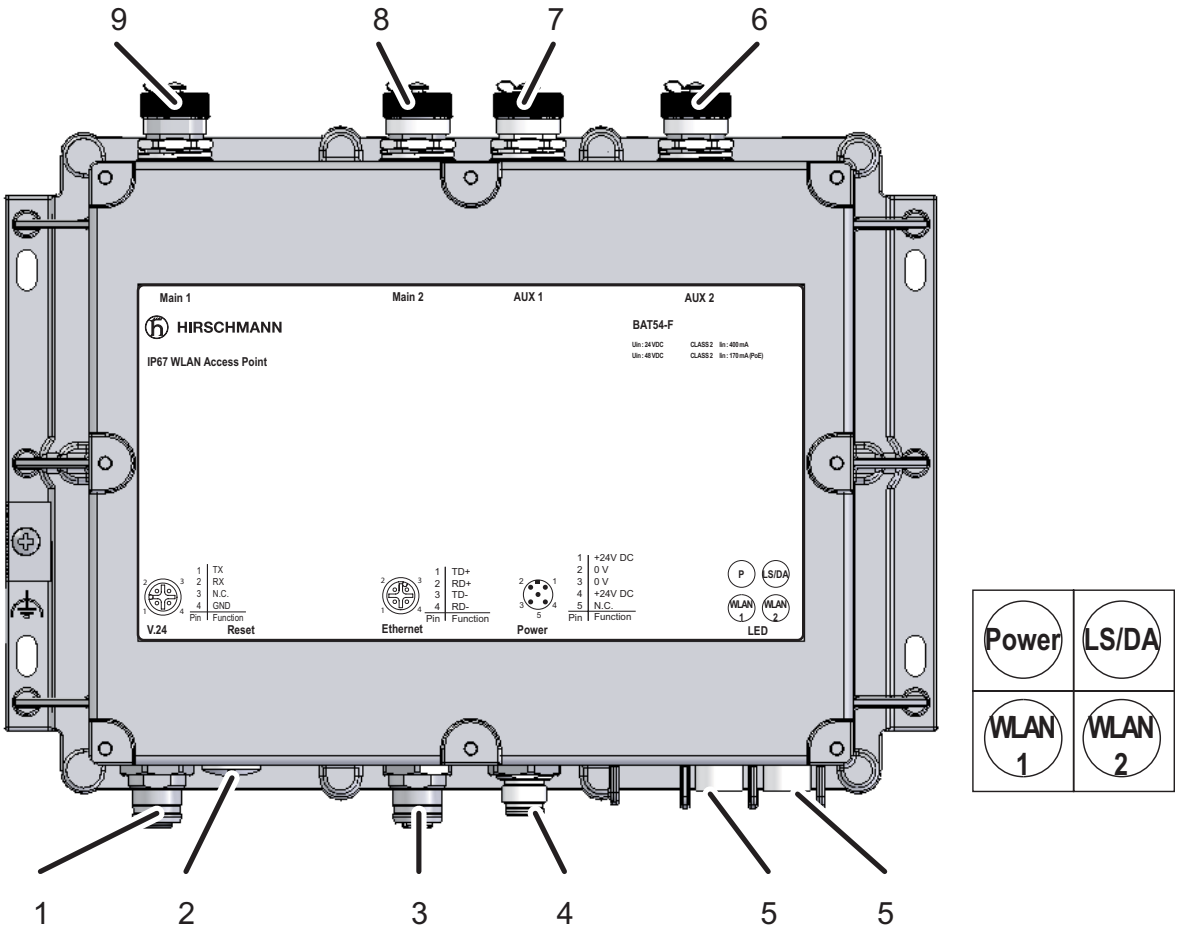
Communication via all levels

The addition, to the BAT wireless transmission system, of the RS20/ RS30/RS40 open rail range of switches, the MICE range of switches, the MACH range of backbone switches, and the EAGLE security system, provides continuous communication across all levels of the company.

1.2 Interfaces and control elements

1.2.1 BAT54-F

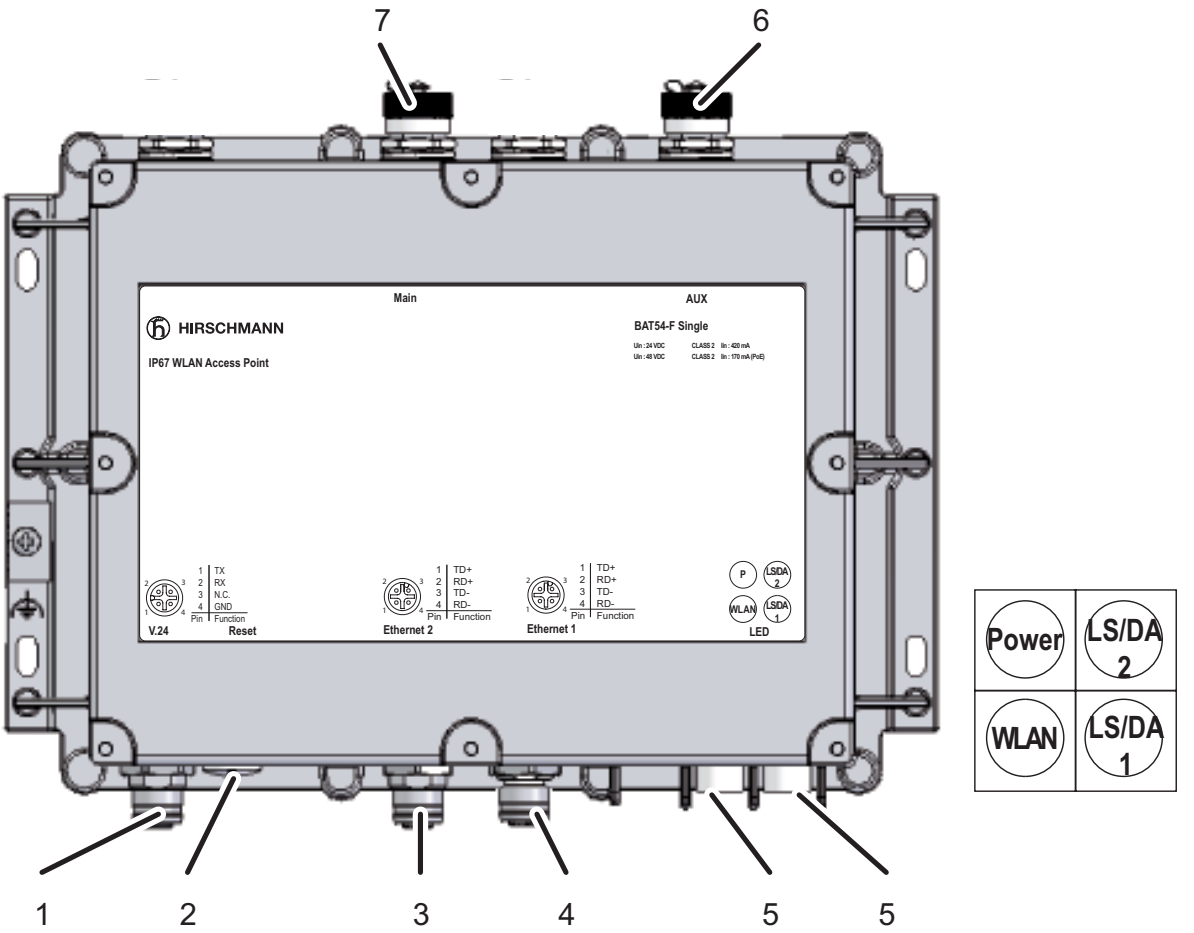
The device is equipped with the following connectors and operation elements:



Interfaces and display and control elements		
1	V.24	Serial interface, 4-pin M12 socket with A coding, data rate min. 19.2 kbit/s, max. 115 kbit/s, connector for serial configuration cable
2	Reset	Reset button behind a removable IP67 cap restarts the device or resets the configuration
3	Ethernet	Ethernet port: 4-pin M12 socket with D coding, 10/100BASE-TX, Autosensing, Power over Ethernet (PoE), automatic MDI/MDIX recognition (no crossover cable required)
4	Power	Power supply connector for safety extra-low voltage (SELV/PELV), 5-pin M12 plug
5	LED	4 display elements (power, LS/DA, WLAN1, WLAN2)
6	AUX 2	Auxiliary connector for the second WLAN module for connecting external antennas
7	AUX 1	Auxiliary connector for the first WLAN module for connecting external antennas
8	Main 2	Main connector for the second WLAN module for connecting external antennas
9	Main 1	Main connector for the first WLAN module for connecting external antennas

1.2.2 BAT54-F Single

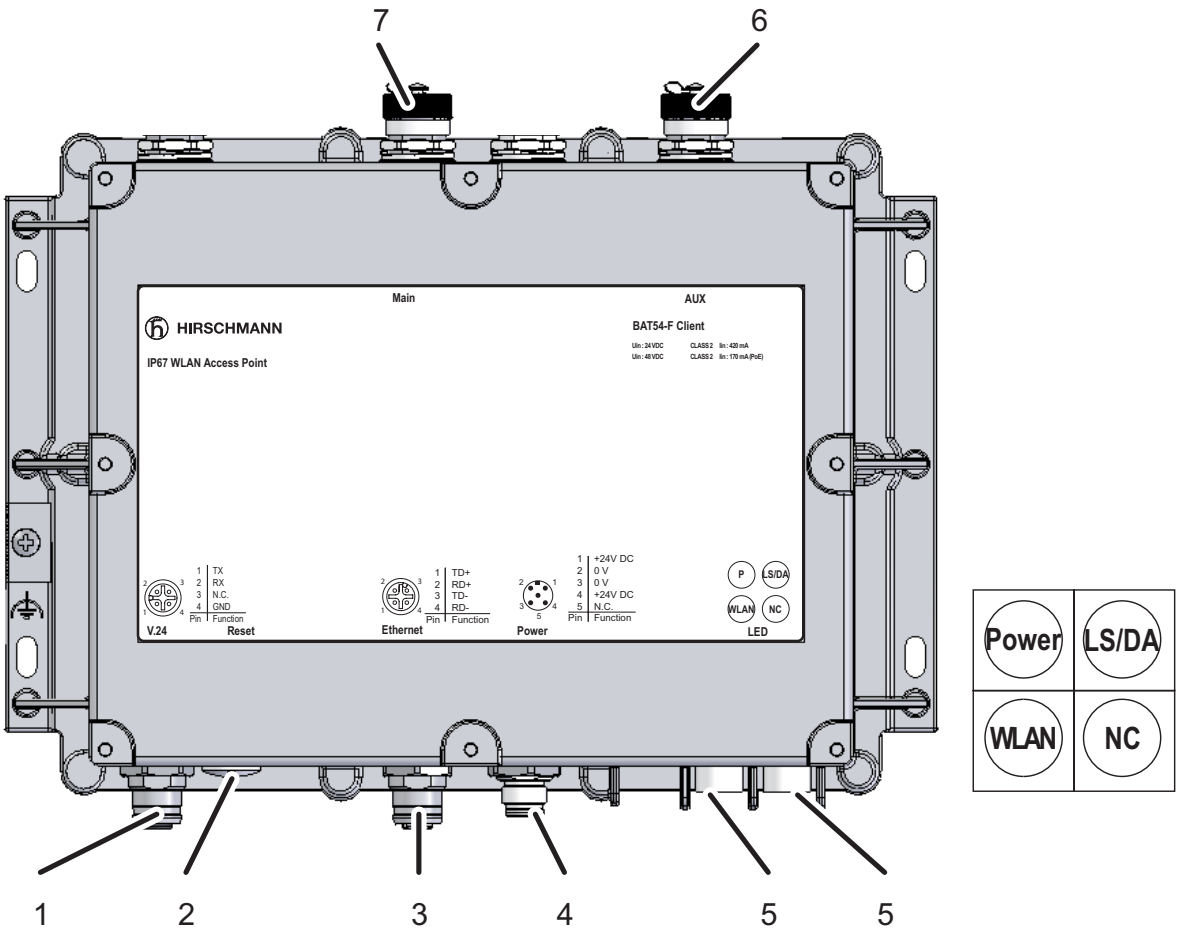
The device is equipped with the following connectors and operation elements:



Interfaces and display and control elements		
1	V.24	Serial interface, 4-pin M12 socket with A coding, data rate min. 19.2 kbit/s, max. 115 kbit/s, connector for serial configuration cable
2	Reset	Reset button behind a removable IP67 cap restarts the device or resets the configuration
3	Ethernet 2	Second Ethernet port 4-pin M12 socket with D coding, 10/100BASE-TX, Autosensing, Power over Ethernet (PoE), automatic MDI/MDIX recognition (no crossover cable required)
4	Ethernet 1	First Ethernet port 4-pin M12 socket with D coding, 10/100BASE-TX, Autosensing, Power over Ethernet (PoE), automatic MDI/MDIX recognition (no crossover cable required)
5	LED	4 display elements (power, LS/DA1, LS/DA2, WLAN)
6	AUX	Auxiliary connector for the WLAN module for connecting external antennas
7	Main	Main connector for the WLAN module for connecting external antennas

1.2.3 BAT54-F Client

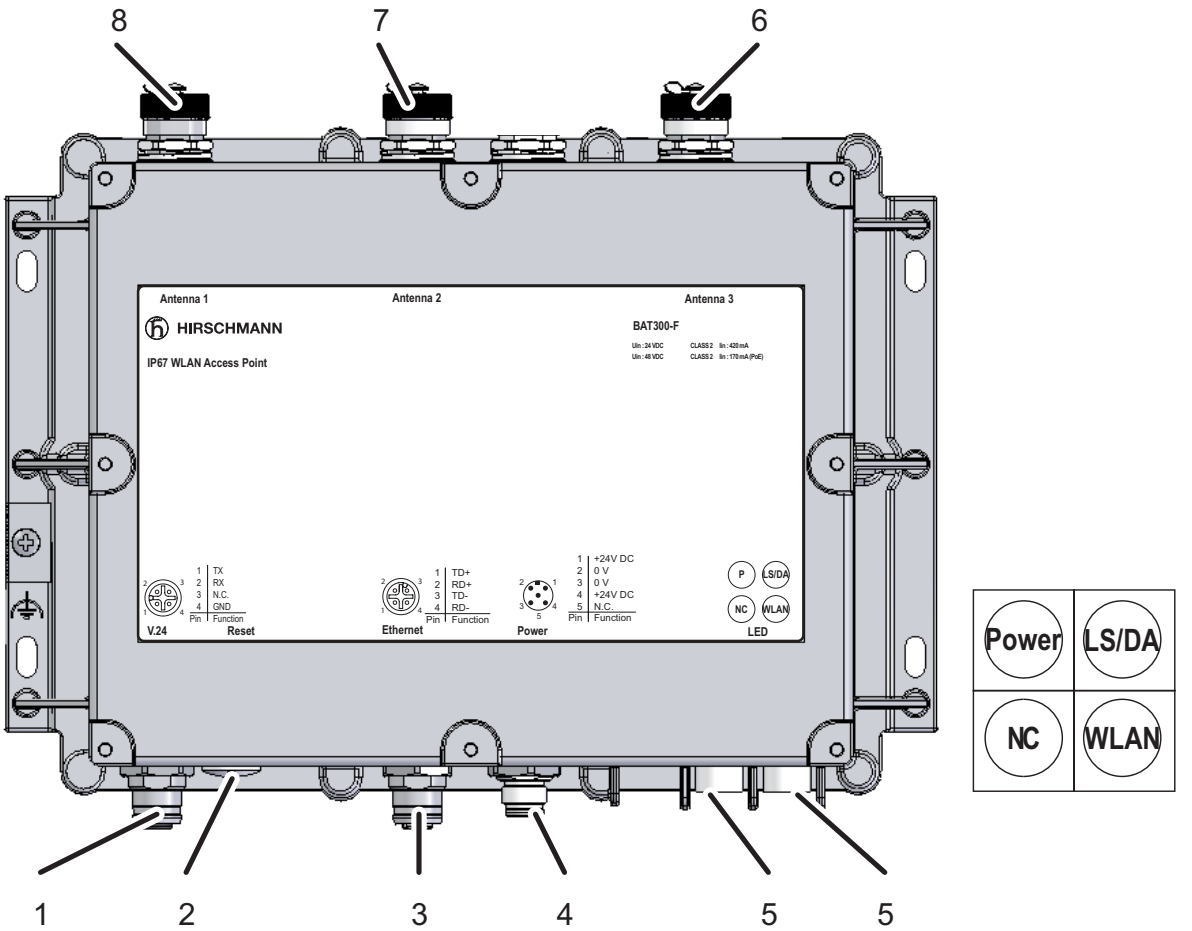
The device is equipped with the following connectors and operation elements:



Interfaces and display and control elements		
1	V.24	Serial interface, 4-pin M12 socket with A coding, data rate min. 19.2 kbit/s, max. 115 kbit/s, connector for serial configuration cable
2	Reset	Reset button behind a removable IP67 cap restarts the device or resets the configuration
3	Ethernet	Ethernet port: 4-pin M12 socket with D coding, 10/100BASE-TX, Autosensing, Power over Ethernet (PoE), automatic MDI/MDIX recognition (no crossover cable required)
4	Power	Power supply connector for safety extra-low voltage (SELV/PELV), 5-pin M12 plug
5	LED	4 display elements (power, LS/DA, WLAN, NC)
6	AUX	Auxiliary connector for the WLAN module for connecting external antennas
7	Main	Main connector for the WLAN module for connecting external antennas

1.2.4 BAT300-F

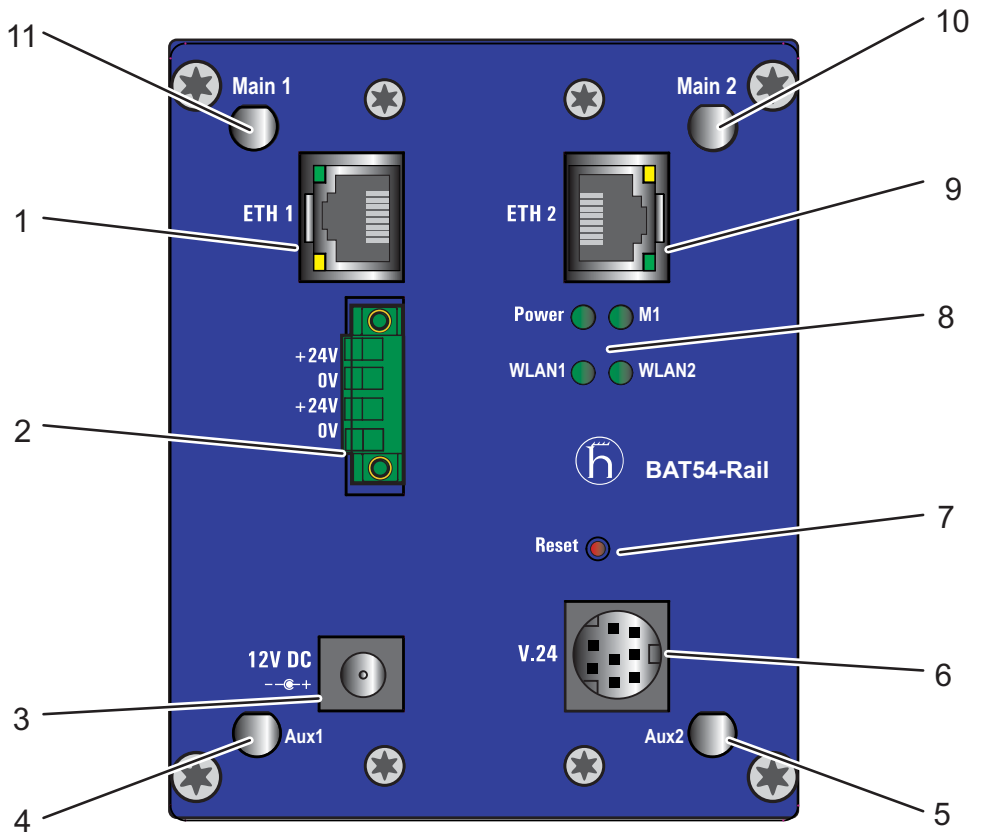
The device is equipped with the following connectors and operation elements:



Interfaces and display and control elements		
1	V.24	Serial interface, 4-pin M12 socket with A coding, data rate min. 19.2 kbit/s, max. 115 kbit/s, connector for serial configuration cable
2	Reset	Reset button behind a removable IP67 cap restarts the device or resets the configuration
3	Ethernet	Ethernet port: 4-pin M12 socket with D coding, 10/100BASE-TX, Autosensing, Power over Ethernet (PoE), automatic MDI/MDIX recognition (no crossover cable required)
4	Power	Power supply connector for safety extra-low voltage (SELV/PELV), 5-pin M12 plug
5	LED	4 display elements (power, LS/DA, WLAN, NC)
6	Antenna 3	Main connector for the WLAN module for connecting the third external antenna
7	Antenna 2	Main connector for the WLAN module for connecting the second external antenna
8	Antenna 1	Main connector for the WLAN module for connecting the first external antenna

1.2.5 BAT54-Rail

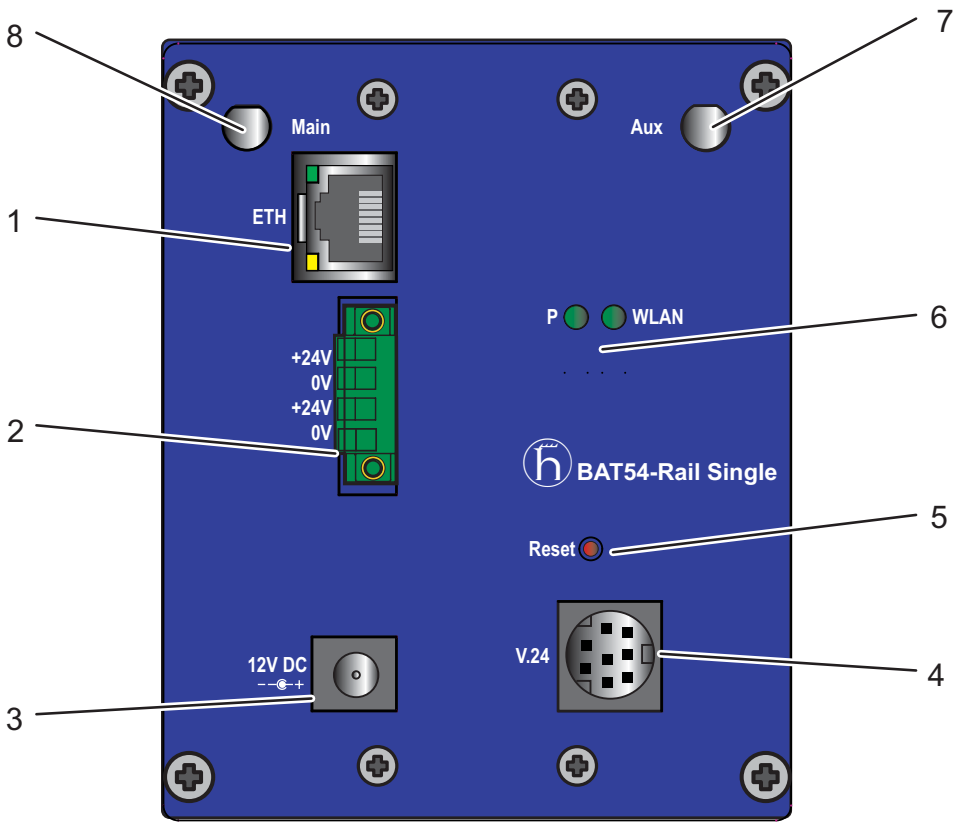
The device is equipped with the following connectors and operation elements:



Interfaces and display and control elements		
1	ETH1	First Ethernet port 10/100BASE-TX, Autosensing, Power over Ethernet (PoE), automatic MDI/ MDIX recognition (no crossover cable required)
2	+24V 0V	Power, power supply connector for safety extra-low voltage (SELV/PELV)
3	12V DC	Power, power supply connector for safety extra-low voltage (SELV/PELV)
4	AUX 1	Auxiliary connector for the first WLAN module for connecting external antennas
5	AUX 2	Auxiliary connector for the second WLAN module for connecting external antennas
6	V.24	MiniDin serial interface, data rate min. 19.2 kbit/s, max. 115 kbit/s, connector for serial configuration cable
7	Reset	Reset button to restart device or reset the configuration
8	LED	4 display elements (power, M1, WLAN1, WLAN2)
9	ETH2	Second Ethernet port 10/100BASE-TX, Autosensing, Power over Ethernet (PoE), automatic MDI/ MDIX recognition (no crossover cable required)
10	Main 2	Main connector for the second WLAN module for connecting external antennas
11	Main 1	Main connector for the first WLAN module for connecting external antennas

1.2.6 BAT54-Rail Single

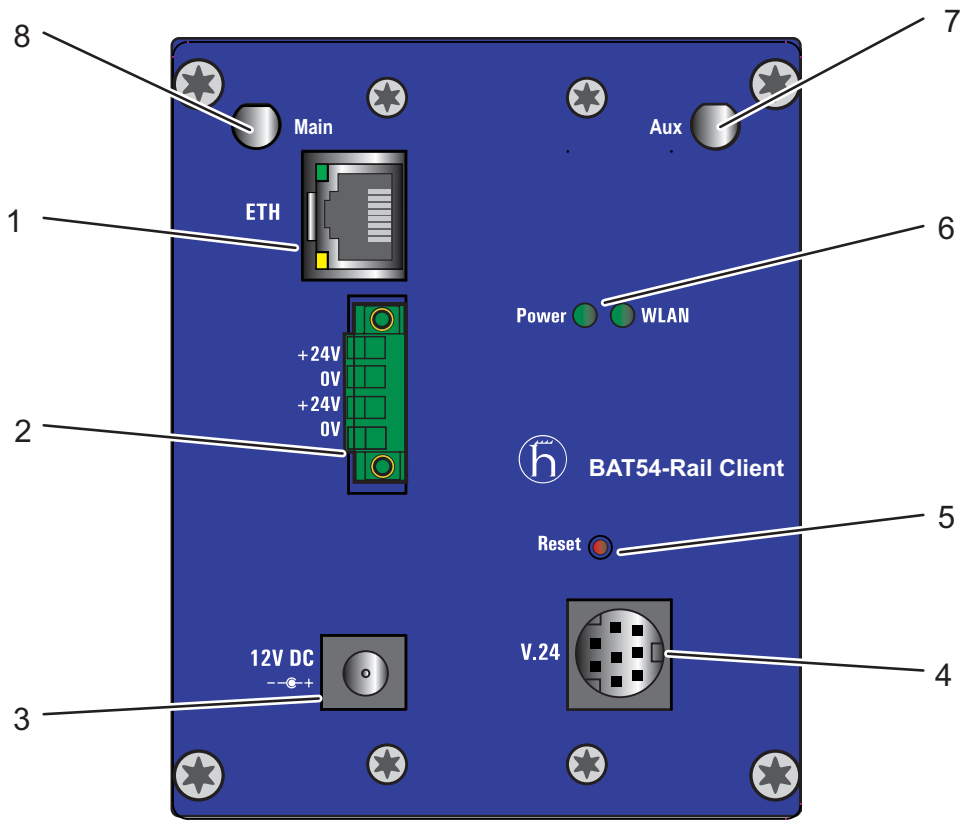
The device is equipped with the following connectors and operation elements:



Interfaces and display and control elements		
1	ETH	Ethernet port: 10/100BASE-TX, Autosensing, Power over Ethernet (PoE), automatic MDI/ MDIX recognition (no crossover cable required)
2	+24V 0V	Power, power supply connector for safety extra-low voltage (SELV/PELV)
3	12V DC	Power, power supply connector for safety extra-low voltage (SELV/PELV)
4	V.24	MiniDin serial interface, data rate min. 19.2 kbit/s, max. 115 kbit/s, connector for serial configuration cable
5	Reset	Reset button to restart device or reset the configuration
6	LED	2 display elements (power, WLAN)
7	AUX	Auxiliary connector for the WLAN module for connecting external antennas
8	Main	Main connector for the WLAN module for connecting external antennas

1.2.7 BAT54-Rail Client

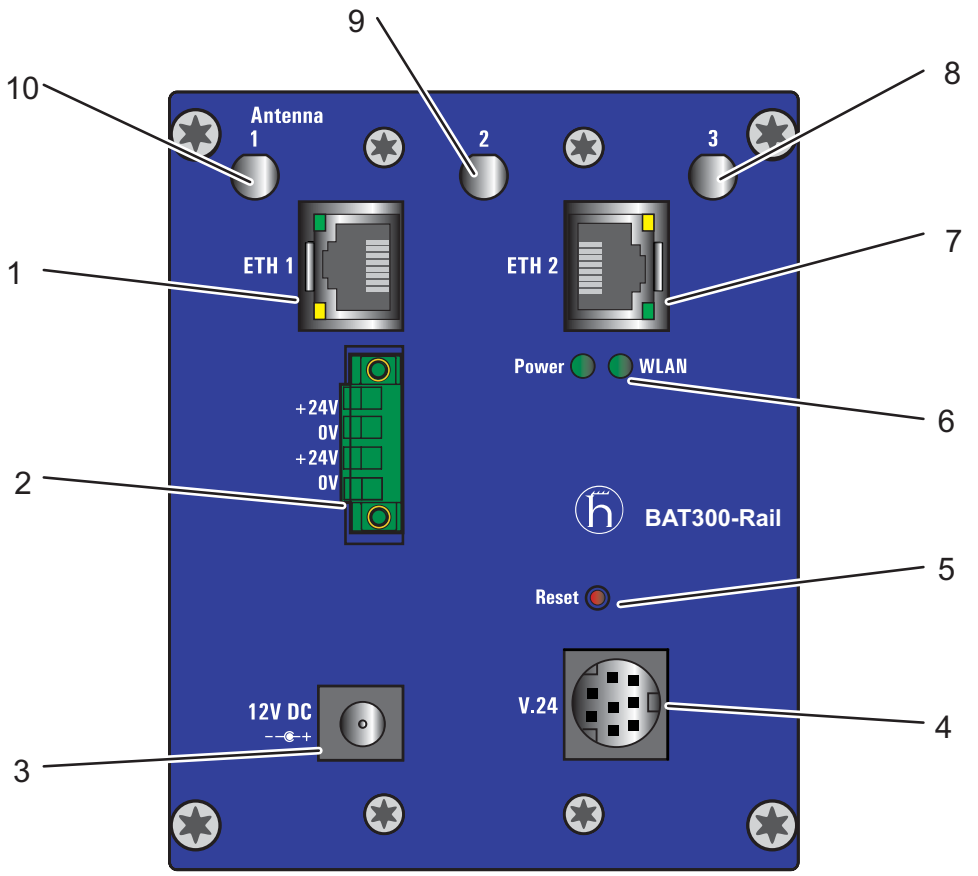
The device is equipped with the following connectors and operation elements:



Interfaces and display and control elements		
1	ETH	Ethernet port: 10/100BASE-TX, Autosensing, Power over Ethernet (PoE), automatic MDI/ MDIX recognition (no crossover cable required)
2	+24V 0V	Power, power supply connector for safety extra-low voltage (SELV/PELV)
3	12V DC	Power, power supply connector for safety extra-low voltage (SELV/PELV)
4	V.24	MiniDin serial interface, data rate min. 19.2 kbit/s, max. 115 kbit/s, connector for serial configuration cable
5	Reset	Reset button to restart device or reset the configuration
6	LED	2 display elements (power, WLAN)
7	AUX	Auxiliary connector for the WLAN module for connecting external antennas
8	Main	Main connector for the WLAN module for connecting external antennas

1.2.8 BAT300-Rail

The device is equipped with the following connectors and operation elements:



Interfaces and display and control elements		
1	ETH1	First Ethernet port 10/100BASE-TX, Autosensing, Power over Ethernet (PoE), automatic MDI/ MDIX recognition (no crossover cable required)
2	+24V 0V	Power, power supply connector for safety extra-low voltage (SELV/PELV)
3	12V DC	Power, power supply connector for safety extra-low voltage (SELV/PELV)
4	V.24	MiniDin serial interface, data rate min. 19.2 kbit/s, max. 115 kbit/s, connector for serial configuration cable
5	Reset	Reset button to restart device or reset the configuration
6	LED	2 display elements (power, WLAN)
7	ETH2	Second Ethernet port 10/100BASE-TX, Autosensing, Power over Ethernet (PoE), automatic MDI/ MDIX recognition (no crossover cable required)
8	Antenna 3	Main connector for the WLAN module for connecting the third external antenna
9	Antenna 2	Main connector for the WLAN module for connecting the second external antenna
10	Antenna 1	Main connector for the WLAN module for connecting the first external antenna

1.3 Device models

1.3.1 BAT54-F devices

Device	Area of application
BAT54-F FCC	Outdoors, also hazardous environments
BAT54-F	Outdoors, also hazardous environments
BAT54-F X2 FCC	Outdoors, also under extreme conditions, including environments with the danger of explosions
BAT54-F X2	Outdoors, also under extreme conditions, including environments with the danger of explosions
BAT54-F Client	Outdoors, also hazardous environments
BAT54-F Client FCC	Outdoors, also hazardous environments
BAT54-F Single	Outdoors, also hazardous environments
BAT54-F Single FCC	Outdoors, also hazardous environments

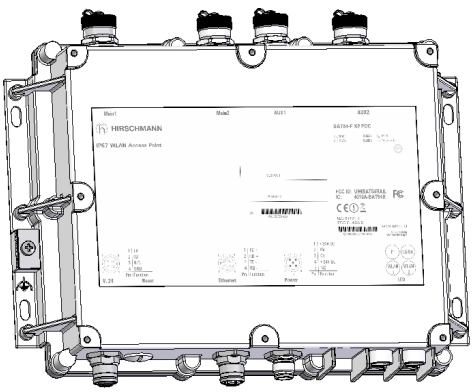


Figure 2: BAT-F type device variants

Figure 3: Device models with housing cover: BAT-X2 types

1.3.2 BAT54-Rail devices

Device	Area of application
BAT54-Rail	DIN rail and flat surface mounting
BAT54-Rail - FCC	DIN rail and flat surface mounting
BAT54-Rail - Japan	DIN rail and flat surface mounting
BAT54-Rail Client	DIN rail and flat surface mounting
BAT54-Rail Client (FCC)	DIN rail and flat surface mounting
BAT54-Rail Single	DIN rail and flat surface mounting
BAT54-Rail Single (FCC)	DIN rail and flat surface mounting

1.3.3 BAT300-F devices

Device	Area of application
BAT300-F	DIN rail and flat surface mounting Higher radio output and more stable network coverage through MIMO with 3 antennas
BAT300-F FCC	DIN rail and flat surface mounting Higher radio output and more stable network coverage through MIMO with 3 antennas
BAT300-F X2	DIN rail and flat surface mounting Higher radio output and more stable network coverage through MIMO with 3 antennas Outdoors, also under extreme conditions, including environments with the danger of explosions

1.3.4 BAT300-Rail devices

Device	Area of application
BAT300-Rail	DIN rail and flat surface mounting Higher radio output and more stable network coverage through MIMO with 3 antennas
BAT300-Rail FCC	DIN rail and flat surface mounting Higher radio output and more stable network coverage through MIMO with 3 antennas

1.3.5 BAT-BG/BGN devices

Device	Area of application
BAT300-Rail BGN	Using the 2.4 GHz ISM wave band DIN rail and flat surface mounting Higher radio output and more stable network coverage through MIMO with 3 antennas
BAT300-F BGN	Using the 2.4 GHz ISM wave band Higher radio output and more stable network coverage through MIMO with 3 antennas
BAT54-F Client BG	Using the 2.4 GHz ISM wave band Outdoors, also hazardous environments
BAT54-F Single BG	Using the 2.4 GHz ISM wave band Outdoors, also hazardous environments
BAT54-F BG	Using the 2.4 GHz ISM wave band Outdoors, also hazardous environments
BAT54-F X2 BG	Using the 2.4 GHz ISM wave band Outdoors, also under extreme conditions, including environments with the danger of explosions
BAT54-Rail Client BG	Using the 2.4 GHz ISM wave band DIN rail and flat surface mounting
BAT54-Rail BG	Using the 2.4 GHz ISM wave band DIN rail and flat surface mounting
BAT54-Rail Single BG	Using the 2.4 GHz ISM wave band DIN rail and flat surface mounting
BAT300-F X2 BGN	Using the 2.4 GHz ISM wave band Outdoors, also under extreme conditions, including environments with the danger of explosions Higher radio output and more stable network coverage through MIMO with 3 antennas

2 Assembly and start-up

2.1 Installing the device

The devices have been developed for practical application in a harsh industrial environment.

On delivery, the device is ready for operation.
The following procedure has been proven to be successful for the assembly of the device:

- Unpacking and checking
- Putting components together (BAT-F)
- Selecting the location for mounting/setting up
- Mounting outdoors (BAT-F)
- DIN rail mounting (BAT-Rail)
- Flat surface mounting
- Mounting/connecting external antennas
- Connecting LAN and WLAN connectors
- Connecting the supply voltage
- Grounding
- Installing the data lines
- Installing the housing cover BAT-F X2
- Installing external antennas
- Starting up
- Configuring devices
- Establishing basic settings

Before installing and starting up the device, note the safety instructions (see page 5 onwards).

2.2 Unpacking and checking

☐ Check that the contents of the package are complete (see page 62 “Scope of delivery“).
☐ Check the individual parts for transport damage.

2.3 Putting components together (BAT-F)

To protect the exposed contacts of the components from dirt, the individual system components must be connected in a dry and clean area. Seal unused ports with the cover caps supplied.

Note: Connectors are not electrical isolating devices.
Therefore, first plug the connector into the power supply plug, then switch on the power supply.

Note: Protection class IP67 is only achieved if all the connected components also fulfill protection class IP67.

☐ Cover unused connectors with the cover caps supplied.
☐ Only connect plugs and other components that fulfill protection class IP67, and that are certified for a temperature range from -30 °C to +55 °C (-22 °F to +131 °F).

2.4 Selecting the location for mounting/ setting up

☐ Set up/mount the device in a location where the ambient conditions comply with the specified listed in the technical data.

2.5 Mounting outdoors (BAT-F)

Note: Set up the antenna close to the device. Use the shortest antenna cable possible to minimize attenuation.

Note: Connectors are subject to corrosion in outdoor WLAN installations which can result in higher attenuation.
Seal the outdoor connectors with water- and weather-resistant tape.

2.5.1 Lightning protection

☐ Note the safety instructions for lightning protection (see the datasheet for lightning protection or the WLAN Outdoor Guide).
☐ If possible, avoid installing in locations with a high risk of lightning. This applies in particular to installing antennas.

The antenna should not be the highest point in the area. If this is the case, use a separate lightning conductor to divert lightning strikes.

Warning

Lightening protection is an indispensible part of your outdoor antenna installation. It protects your sensitive electronic devices from transient or electrostatic discharges to the antenna.

Warning

Antennas placed outdoors must be within the catchment area of a lightening conductor. Make sure that there is lightening protection equipotential bonding for all conductive systems leading from outdoors. When implementing your lightening protection concept, make sure you meet the requirements of standards VDE 0182 and IEC 62305.

Hirschmann recommends using the Hirschmann BAT Protector as a lightening protection (see on page 62 “Accessories“).

Warning

Installing this lightening protection element between an antenna and a BAT-F does not alone provide sufficient protection against a lightening strike. The BAT Protector lightening protection element only works as part of a comprehensive lightening protection concept. If you have any questions relating to this, contact a qualified dealer.

Note: The requirements of EN61000-4-5, surge test on power supply lines, are only met if a Blitzductor VT AD 24V, article No. 918 402, is used. Manufacturer: DEHN+SÖHNE GmbH+Co.KG, Hans Dehn Str.1, Postfach 1640, D-92306 Neumarkt.

Warning

Connect the external antenna, the housing ground and the lightening protection to the same ground system, e.g. to the building ground.

For further information on lightning protection, see the “WLAN Outdoor Guide”.

2.5.2 Pole mounting

The BAT-F devices are suitable for pole mounting with the additional BAT-F pole mounting set (see on page 62 “Accessories“).

The BAT-F pole mounting set is designed for:

- Pole diameter: 37 mm to 60 mm (1.46 in to 2.36 in)
- Maximum permitted wind speed: 220 km/h (136 mph).

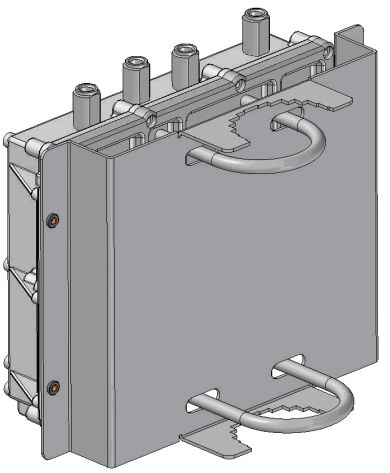


Figure 4: BAT-F pole mounting set

2.6 DIN rail mounting (BAT-Rail)

☐ Mount the device on a 35 mm DIN rail in accordance with DIN EN 60175.
☐ Attach the upper snap-in guide of the device into the DIN rail and press it down against the DIN rail until it snaps into place.

Note: The shielding ground of the industrial connectable twisted pair lines is connected to the lower panel as a conductor.

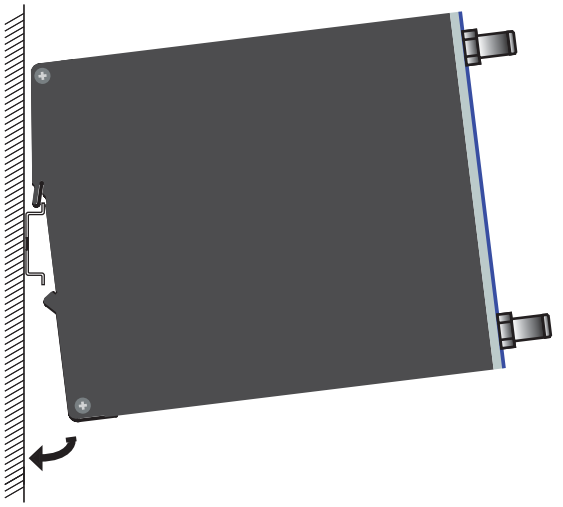


Figure 5: Mounting on the DIN rail

2.7 Flat surface mounting

2.7.1 BAT-F

☐ Drill holes at the installation point.
☐ Mount the device on a flat surface with four M5 screws.

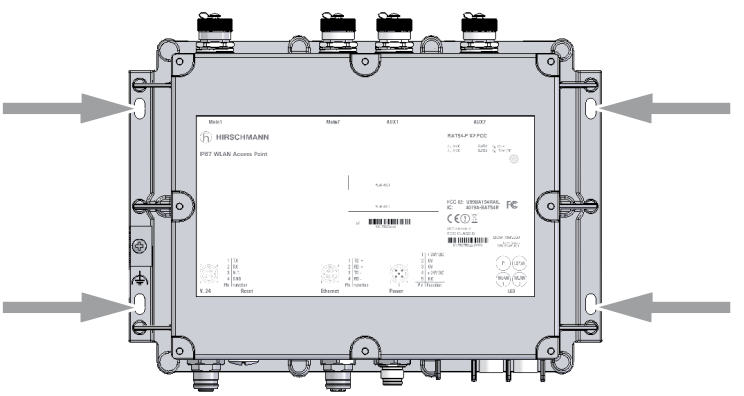


Figure 6: BAT-F, mounting on a flat surface (e.g. wall)

2.7.2 BAT-Rail

Figure 7: BAT-Rail, wall mounting

☐ Fasten on the wall mounting plate (width 120 mm / 4.73 in) (see on page 62 “Accessories“) on a level wall surface using four screws.

☐ Mount the device on the wall plate as shown in the illustration. Attach the upper snap-in guide of the device into the rail and press it down against the rail until it snaps into place.

2.8 Mounting/connecting external antennas

2.8.1 Connections for external antennas on BAT-F

The BAT-F devices have two to four connections for connecting external antennas. These connections are N sockets.
The housing of the N socket and the signal connection are electrically connected to the switching ground, the functional ground (FE) (⏚) and the metal housing of the device.
On delivery, the connectors are sealed with cover caps.

☐ Unscrew the cover caps from the connectors to which you want to connect external antennas.

Note: Insert the terminators supplied into unused sockets in order to avoid radio signals from one WLAN module being received by the other WLAN module.

BAT54-F

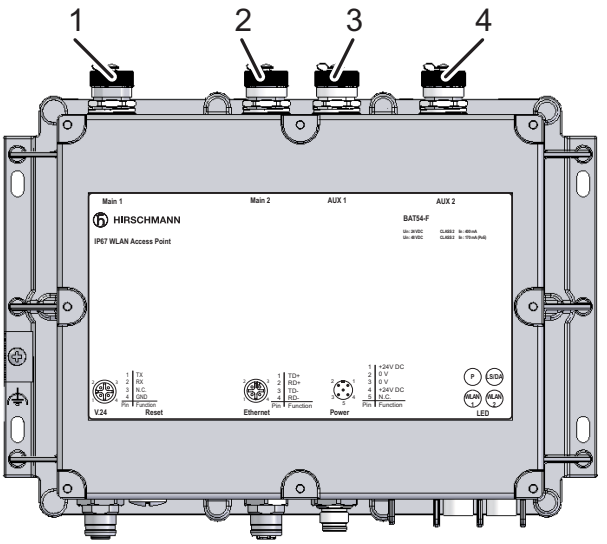


Figure 8: Connections for external antennas on BAT54-F
1 - Main 1
2 - Main 2
3 - AUX 1
4 - AUX 2

BAT54-F Single

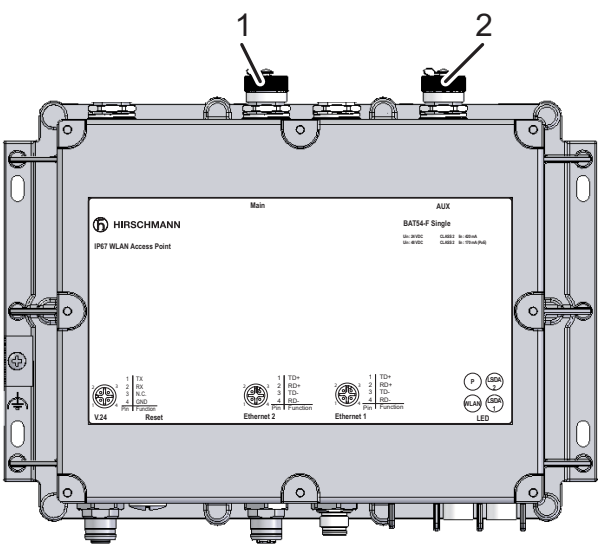


Figure 9: Connections for external antennas on BAT54-F Single
1 - Main
2 - AUX

BAT54-F Client

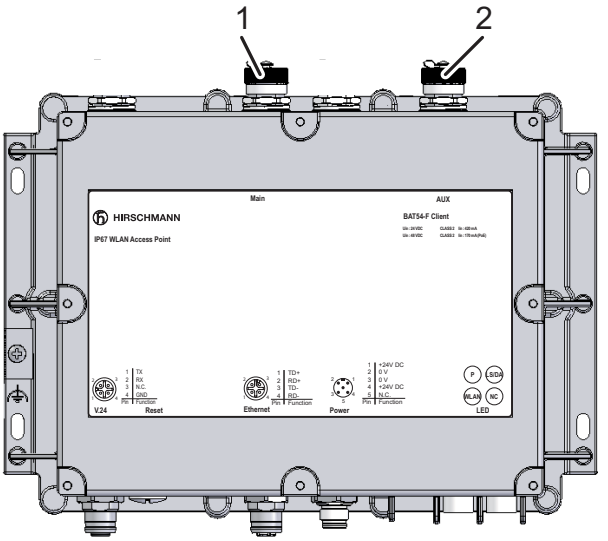


Figure 10: Connections for external antennas on BAT54-F Client

1 - Main

2 - AUX

BAT300-F

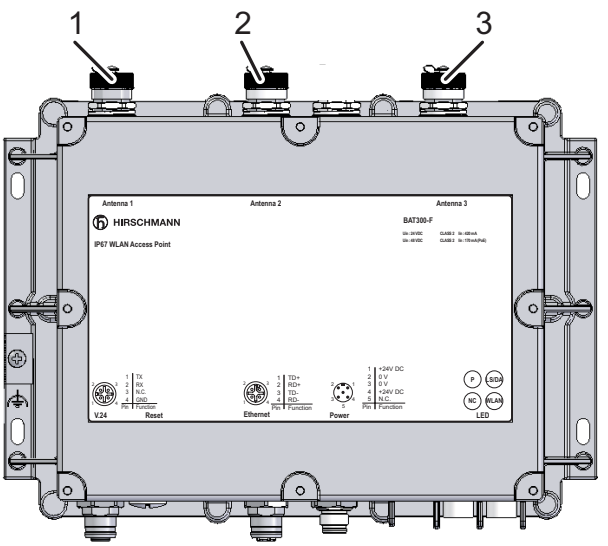


Figure 11: Connections for external antennas on BAT300-F

1 - Antenna 1

2 - Antenna 2

3 - Antenna 3

2.8.2 Connections for external antennas on BAT-Rail

BAT54-Rail

The devices have four Reverse satellite master antenna (SMA) connectors for connecting external antennas.

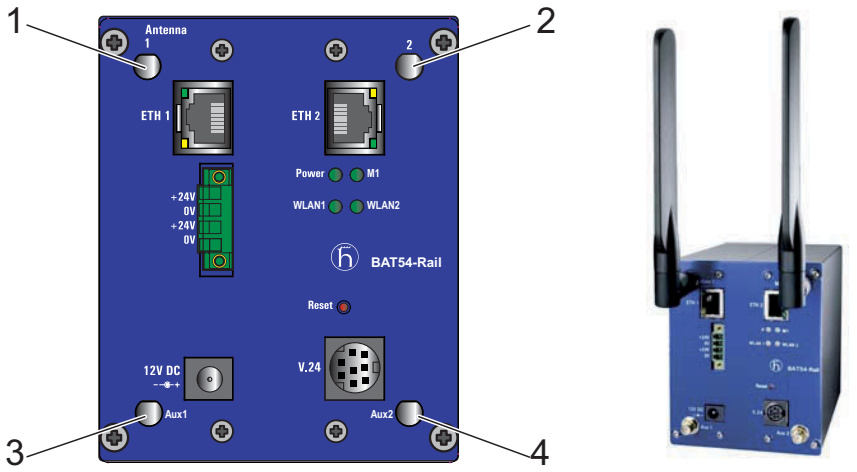


Figure 12: Connections for external antennas on BAT54-Rail

1 - Antenna 1
2 - Antenna 2
3 - Aux1
4 - Aux2

BAT54-Rail Single

The devices have two Reverse SMA connectors for connecting external antennas.

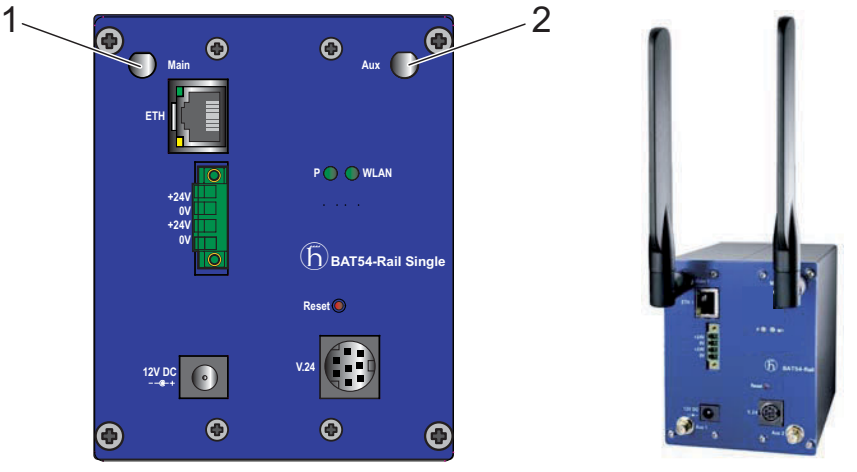


Figure 13: Connections for external antennas on BAT54-Rail Single

1 - Main
2 - Aux

BAT54-Rail Client

The devices have two Reverse SMA connectors for connecting external antennas.

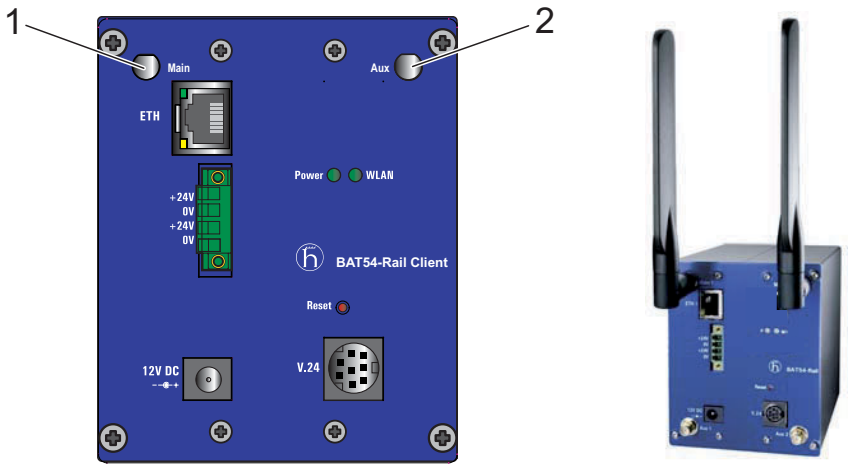


Figure 14: Connections for external antennas on BAT54-Rail Client

1 - Main

2 - Aux

BAT300-Rail

The devices have three Reverse SMA connectors for connecting external antennas.

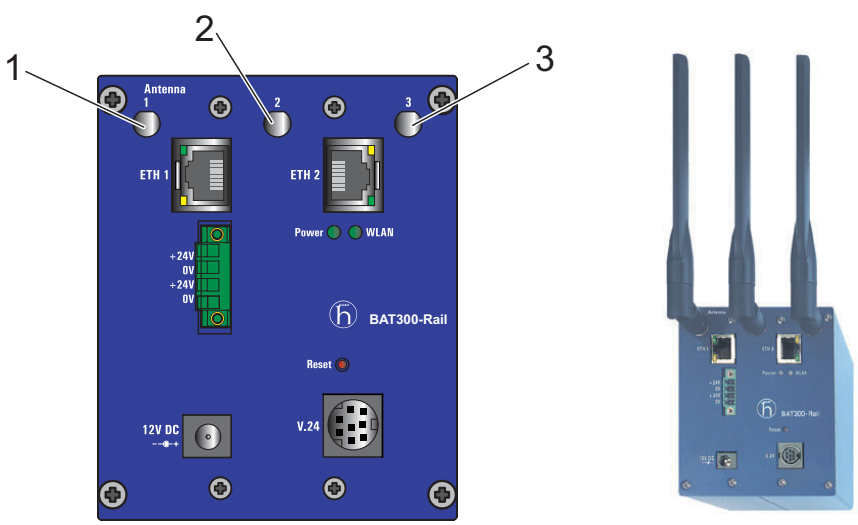


Figure 15: Connections for external antennas on BAT300-Rail

1 - Antenna 1

2 - Antenna 2

3 - Antenna 3

2.8.3 Mounting external antennas

☐ Connect the external antenna to the corresponding ‘Antenna Main’ connection.
☐ If you only want to connect one antenna with only one connection for each radio module, you use the main connection.
☐ BAT54 types: Use the respective main connection of the two WLAN modules to connect antennas that have only one antenna connection without diversity.
☐ Use the main and auxiliary connections of one WLAN module if you want to use the diversity function. The diversity function increases the connection quality by always sending or receiving via the antenna providing the best contact to the client. Then also set this option for the respective radio module.

2.9 Connecting LAN and WLAN connectors

In the “Dual-Band Industrial Access Point / Client / Access Bridge BAT54-Rail” user manual, you will find further information for connecting the LAN and WLAN connections with the corresponding remote terminals.

2.9.1 BAT-F

☐ Connect the access point to your LAN for configuration.
☐ Assemble the network cable with the M12 plug supplied.
☐ Plug the network cable into the LAN connector of the device, and into a free network connection port on your local network (or into a free port on a hub/switch). Alternatively, you can connect the device to a separate PC. The port auto-negotiates upon connection; either a straight or a crossover cable can be used.

2.9.2 BAT-Rail

☐ Connect the access point to your LAN for configuration.
☐ Plug the network cable into the LAN connector of the device, and into a free network connection port on your local network (or into a free port on a hub/switch). Alternatively, you can connect the device to a separate PC. The port auto-negotiates upon connection; either a straight or a crossover cable can be used.

2.10 Grounding

2.10.1 BAT-F

A separate anti-torsion screw connector on the housing is provided for the functional ground (FE) . It is indicated by the functional ground symbol (⏚). The functional ground is electrically connected to the switching ground and to the metal housing of the device.

☐ For the ground wire, use a copper wire with a minimum cross section of 4 mm^2 to 6 mm^2 (for North America: AWG 11 to AWG 9) (including any terminal sleeve used), and implement the grounding of the device via the screw connector.

☐ Clamp the ground wire between the two rectangular fastening plates - as shown in the figure below - and fasten the screw.

☐ Make sure that the stripped part of the ground wire is not in direct contact with the aluminum housing of the device.

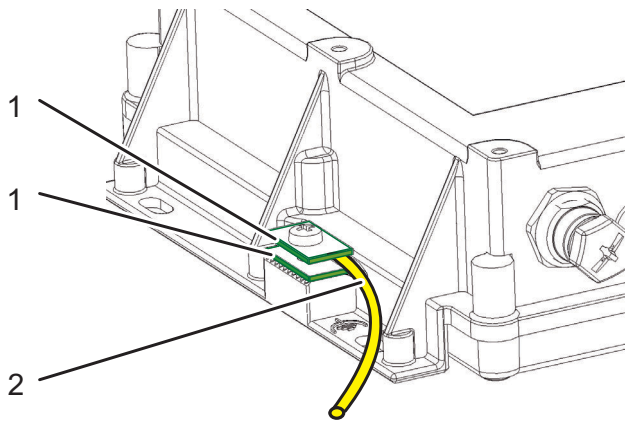


Figure 16: BAT54-F ground connection
1 - Fastening plates for ground wire
2 - Ground wire

2.10.2 BAT-Rail

The lower panel of the device housing is grounded by means of the DIN rail.

2.11 Connecting the supply voltage

For redundant and outfall-resistant power, you can connect multiple power sources in any combination at the same time. The device automatically selects the power supply.

Note: Switch over to a redundant power supply may not be seamless. If the power supply currently active is interrupted and another power supply takes over, the device may reboot to activate the redundant power supply.

2.11.1 5-pin M12 connector (BAT-F)

A 5-pin M12 connector (A coding, supplied) is used to connect the power supply.
On delivery, the connectors are sealed with cover caps.
The housing of the M12 frame connector is electrically connected to the functional ground (FE) (⏚) and to the metal housing of the device. The supply voltage is electrically isolated from the housing.

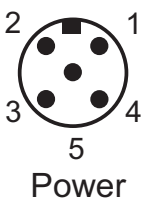
Figure	Pin	Function
 Power	1	+ 24 V DC
	2	0 V
	3	0 V
	4	+ 24 V DC
	5	N.C. (not used)

Table 4: Pin assignment of the 5-pin M12 connector on the BAT-F

Note: For the BAT54-F, the voltage supply is exclusively via PoE page 43 “Power over Ethernet (PoE) - power supply via the LAN cable“.

2.11.2 4-pin terminal block (BAT-Rail)

The supply voltage is connected via a 4-pin terminal block which is locked with screws.

Redundant power supplies can be used. Both inputs are uncoupled. There is no distributed load. With redundant supply, the power supply unit supplies the device only with the higher output voltage. The supply voltage is electrically isolated from the housing.

Warning
For safety reasons the devices have been designed to operate at low voltages. Thus, they may only be connected to the supply voltage connections and to the signal contact with SELV circuits with the voltage restrictions in accordance with IEC/EN 60950-1.

Note: Relevant for BAT-Rail types:
The tightening torque for field wiring terminals is 2 - 4 lb in. (0.22 - 0.25 Nm).

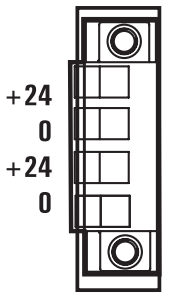
Figure	Pin	Function	
	1	+24	+ 24 V DC
	2	0	0 V
	3	+24	+ 24 V DC
	4	0	0 V

Table 5: Pin assignment of the 4-pin terminal block on the BAT-Rail

2.11.3 Power over Ethernet (PoE) - power supply via the LAN cable

Hirschmann Wireless Routers are prepared for the PoE (Power over Ethernet) procedure and conform to the 802.3af standard. PoE-capable network devices can be supplied with power via the LAN cable. This makes it unnecessary to have a separate power supply for every Access Point, thus considerably reducing the work involved in the installation.

In the BAT-F devices, the voltage is input via the wire pairs transmitting the signal (IEEE 802.3af, mode A).
In the BAT-Rail devices it is also possible to supply the voltage via the free wire pairs.

The power supply to the LAN is input centrally, or via a PoE injector or a power hub/power switch.

Warning
In a PoE installation, only use devices that adhere to the 802.3af standard! No warranty claims can be made for damage caused by the use of impermissible devices.

2.12 Connecting the data lines

2.12.1 10/100 Mbit/s twisted pair connection

In the BAT-F, the 10/100 Mbit/s twisted pair connections are M12 sockets. 10/100 Mbit/s ports enable the connection of terminal devices or independent network segments according to the IEEE 802.3 100BASE-TX / 10BASE-T standard.
These ports support:

- Autonegotiation
- Autopolarity
- Autocrossing (if autonegotiation is activated)
- 100 Mbit/s half-duplex mode, 100 Mbit/s full duplex mode
- 10 Mbit/s half-duplex mode, 10 Mbit/s full duplex mode

State on delivery: autonegotiation activated.

The TP connector is a 4-pin M12 female connector with D coding.
On delivery, the connectors are sealed with cover caps.
The housing of the M12 socket is electrically connected to the functional ground (FE) (⏚) and to the metal housing of the device. The connector pins are electrically separated from the functional ground and the metal housing.

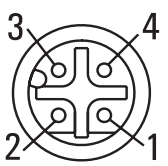
Figure	Pin	Function		PoE voltage input
	1	TD+	Transmit Data +	V-
	2	RD+	Receive Data +	V+
	3	TD-	Transmit Data -	V-
	4	RD-	Receive Data -	V+
	Housing: shield			

Table 6: Pin assignment of a TP/TX interface (M12 socket)

☐ Use a shielded CAT5 cable.
☐ Use a shielded 4-pin M12 plug.
☐ Connect the cable shield to the connector housing.

The patch cables for operating the device are shown in the following figure:

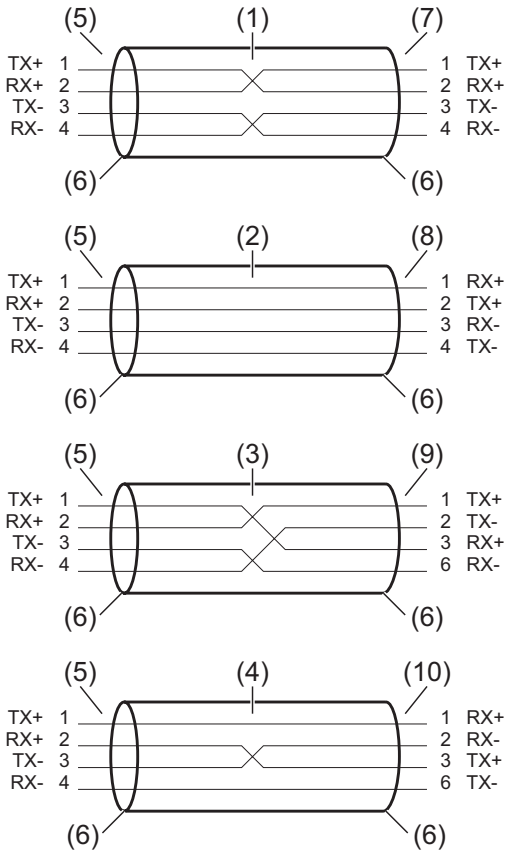


Figure 17: Patch cables for operating the device

(1) - Connection cables M12-4 on M12-4, crossed
(2) - Connection cables M12-4 on M12-4, 1 to 1
(3) - Connection cables M12-4 on RJ45, crossed
(4) - Connection cables M12-4 on RJ45, 1 to 1
(5) - M12 (MDI)
(6) - Shield
(7) - M12 (MDI)
(8) - M12 (MDI-X via autocrossing port)
(9) - RJ45, MDI (terminal device)
(10) - RJ45, MDI-X (Switch)

2.12.2 10/100 Mbit/s twisted pair connection

In the BAT-Rail, the 10/100 Mbit/s twisted pair connections are RJ45 sockets.
10/100 Mbit/s ports enable the connection of terminal devices or independent network segments according to the IEEE 802.3 100BASE-TX / 10BASE-T standard.
These ports support:

- Autonegotiation
- Autopolarity
- Autocrossing (if autonegotiation is activated)
- 100 Mbit/s half-duplex mode, 100 Mbit/s full duplex mode
- 10 Mbit/s half-duplex mode, 10 Mbit/s full duplex mode

State on delivery: autonegotiation activated.

The socket housing is electrically connected to the bottom panel.

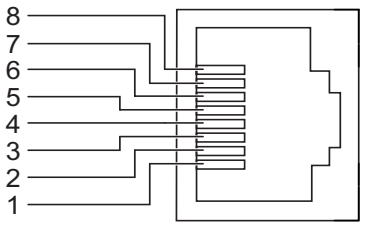
Figure	Pin	Data		PoE voltage input
	1	RD+	Receive Data +	V+
	2	RD-	Receive Data -	V+
	3	TD+	Transmit Data +	V-
	6	TD-	Transmit Data -	V-
	4,5,7,8	Not used		

Table 7: Pin assignment of a TP/TX interface in MDI-X mode, RJ45 socket. PoE voltage input via the wire pairs transmitting the signal (phantom voltage).

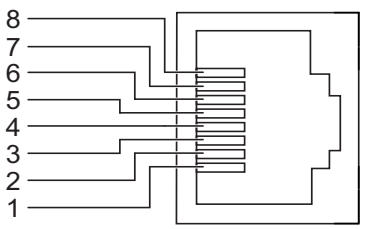
Figure	Pin	Data		PoE voltage input
	1	RD+	Receive Data +	—
	2	RD-	Receive Data -	—
	3	TD+	Transmit Data +	—
	4	—	—	V-
	5	—	—	V-
	6	TD-	Transmit Data -	—
	7	—	—	V+
	8	—	—	V+

Table 8: Pin assignment of a TP/TX interface in MDI-X mode, RJ45 socket. PoE voltage input via the free line pairs (spare pairs).

2.13 Installing the BAT-F X2 housing cover

For use in environments with the danger of explosions, the BAT-F X2 device models have an additional housing cover made of stainless sheet steel. On delivery, the housing cover is pre-mounted.

Perform the installation in the following steps:

☐ Remove the upper part of the housing cover on the device, as shown in the following figure (point 1).
Do not try to remove the lower panel of the housing cover from the device.

☐ Screw the device, including the lower panel of the housing cover, to the mounting surface.

☐ Set up the connections to the device.

☐ Close the housing cover by replacing the upper part of the housing cover.

☐ Fasten the housing cover with four screws, as shown in the following figure (point 2).

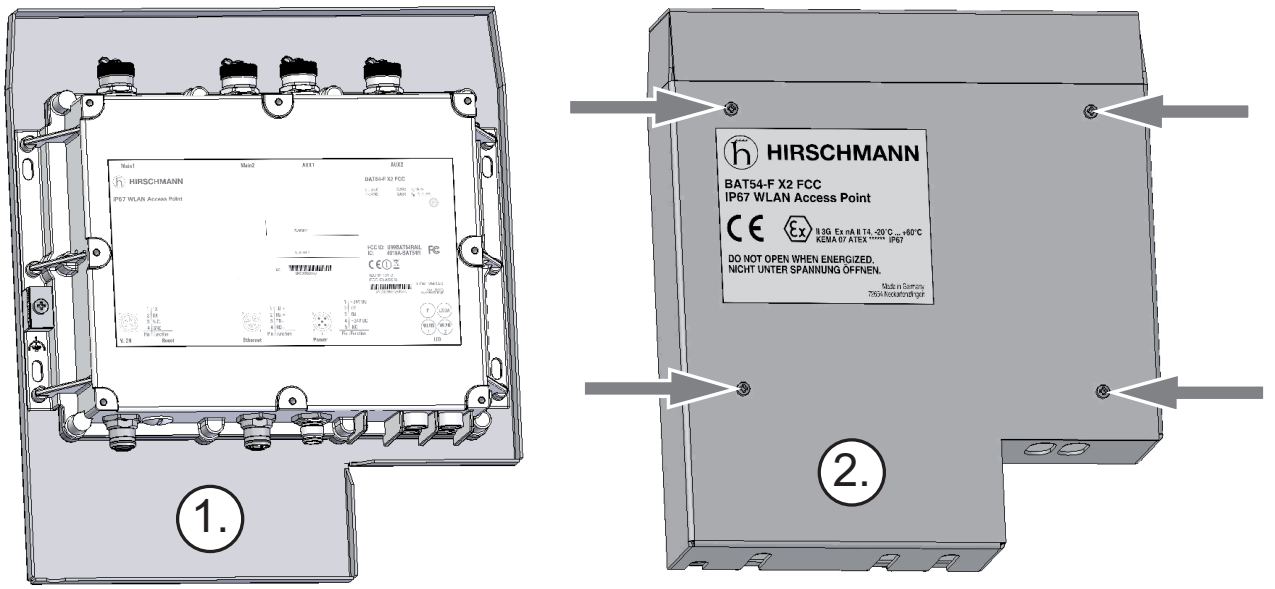


Figure 18: Mounting the housing cover for BAT-F X2 device models with Ex certification in accordance with ATEX 95 (ATEX 100a)

2.14 Startup procedure

2.14.1 BAT-F

Connecting the voltage supply via the 5-pin M12 connector or via the LAN cable (Power over Ethernet) starts the operation of the device.

2.14.2 BAT-Rail

Connecting the voltage supply via the terminal block

- ☐ Pull the terminal block off the device and connect the voltage supply lines.
- ☐ Mount the terminal block for the supply voltage on the front of the device.

Connecting the voltage supply via the terminal block starts the operation of the device.

Connecting the voltage supply via PoE

☐ Alternatively, you can supply the device with the PoE supply voltage via the LAN cable as described above page 43 “Power over Ethernet (PoE) - power supply via the LAN cable“.

Connecting the voltage supply via PoE starts the operation of the device.

2.15 Configuring devices

Apply power to the device before starting the configuration.

BAT devices can be configured in the following ways (if the model is equipped with the corresponding interface):

- Via the wire-bound local area network (LAN).
- Via the radio network (WLAN), if the WLAN encryption (e.g. WPA2) in a device with a wireless interface and in the configuration computer is set respectively.
- Via the serial configuration interface.

Refer to ”ConneXium WiFi TCSG,TSCN Configuration and Administration Guide” on the CD ROM for more details.

2.16 Installing external antennas

External antennas are required to operate the access point.
You will find an overview of the antennas that are supported and can be connected, along with the corresponding technical data, at www.beldensolutions.com.

☐ When installing external antennas, adhere to the regulations of the country in which you are operating the WLAN device, and to the general operating permission and the maximum emission levels.

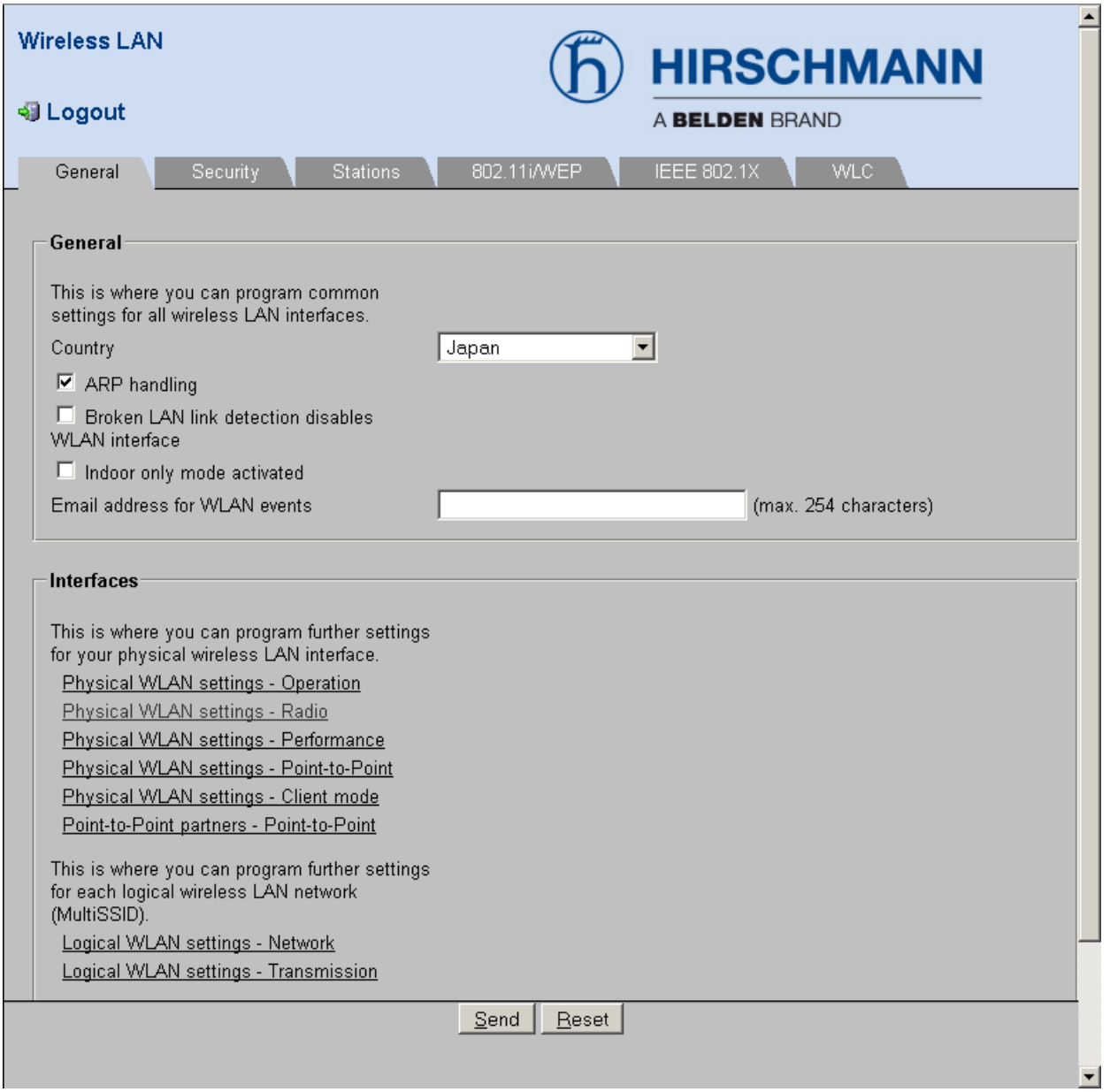
Transmission power

The operator of a WLAN radio installation must adhere to the applicable transmission threshold values.

☐ Use the LANconfig or the Webconfig to start the configuration of the device. (This software is located on the CD provided.)

☐ Go to the settings for Wireless LAN.

☐ Enter the country in which you are installing the device (see the following figure):



☐ Open the configuration for the physical interface to which you are connecting the antenna. On the Radio tab you will find an entry field for the antenna gain (see the following figure):

☐ Subtract the cable attenuation and any losses due to over voltage protector installed devices from the antenna gain, and enter the result in dB in the antenna gain field.

2.17 Display elements

After the operating voltage is applied, the software starts and initializes itself. The device then performs a self-test. During this process, the LEDs light up. The process takes a number of seconds.

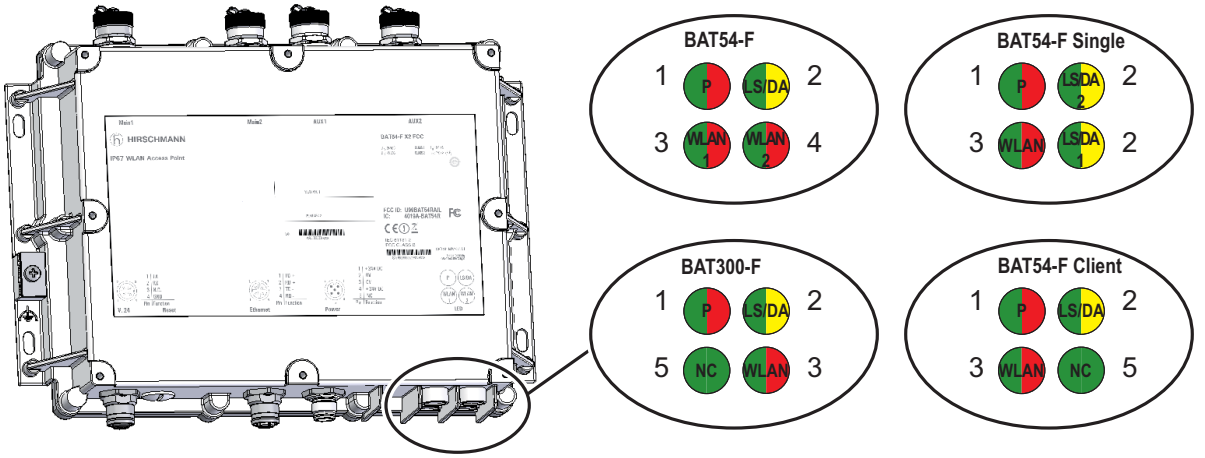


Figure 19: Display elements for the BAT54-F, BAT54-F Single, BAT300-F, BAT54-F Client

1 - P (Power)
2 - LS/DA (Ethernet port link status/data)
3 - WLAN 1
4 - WLAN 2
5 - NC

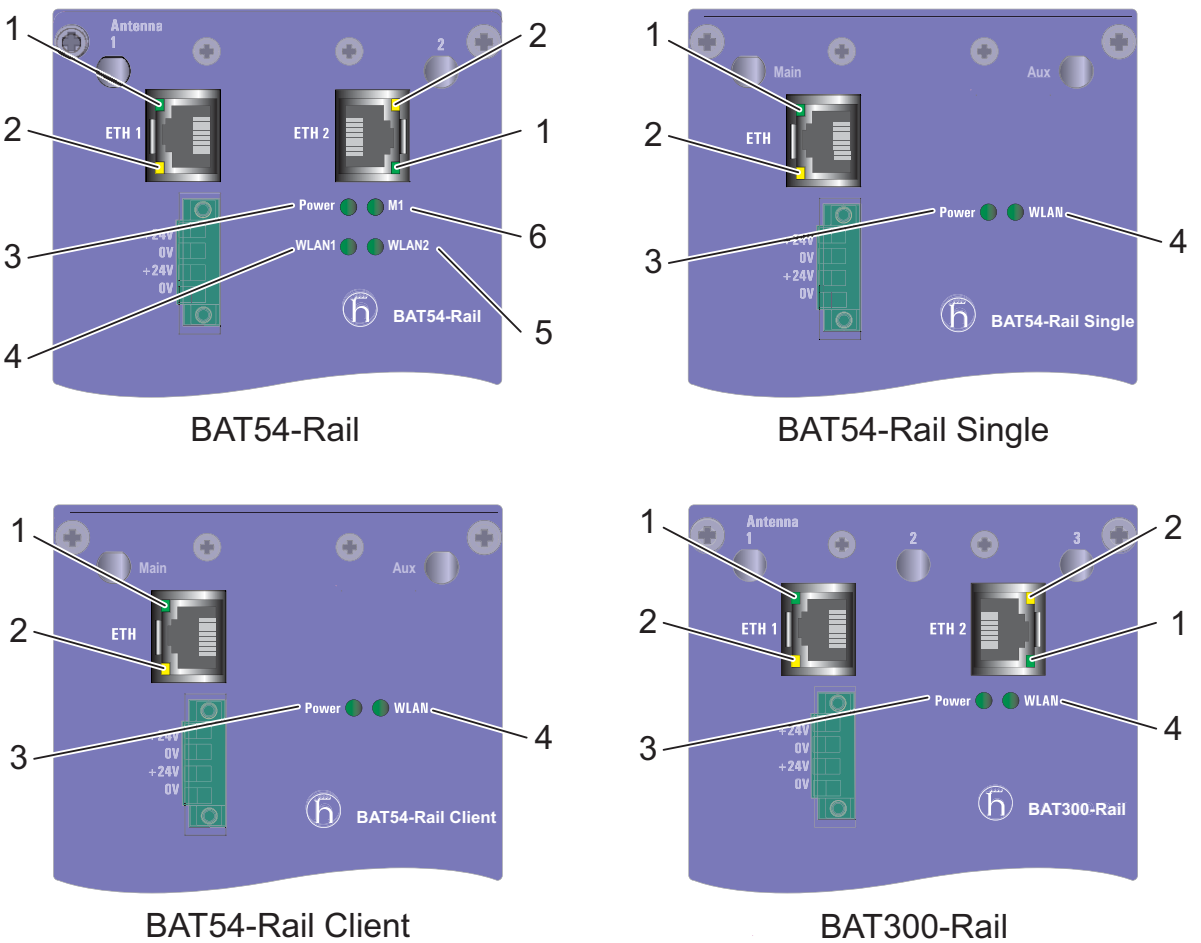


Figure 20: Display elements for BAT54-Rail, BAT54-Rail Client, BAT300-Rail

1 - Ethernet port link status (LS)

2 - Ethernet port data (DA)
3 - Power (P)
4 - WLAN1
5 - WLAN2
6 - M1

Meaning of the LEDs

The behavior of the LEDs is described below:

- **Blinking** means that the LED switches on and off at regular intervals in the color specified.
- **Flashing** means that the LED lights up very briefly in the color specified, then is switched off for a much longer time (about 10x as long).
- **Flashing inversely** means the reverse. Here the LED is on for a long period in the color specified and is only briefly interrupted.
- **Flickering** means that the LED switches on and off at irregular intervals.

Device status

The LEDs shown in the table below provide information about conditions which affect the operation of the entire device.

P (green/ red LED)		**Power**
Green	on continuously	Device is ready for operation.
Red	blinking (slowly)	Charge lock active (see "Dual-Band Industrial Access Point / Client / Access Bridge BAT54-Rail" user manual)
Green/red	blinking (quickly)	Unprotected configuration (no password set)
Red	blinking (quickly)	Hardware error detected.
WLAN 1, WLAN 2 (green/red LEDs)		**WLAN connection and WLAN data traffic of internal WLAN modules**
Off		No WLAN network defined or WLAN module deactivated. No beacons sent from the WLAN module.
Green		At least one WLAN network defined and WLAN module activated. Beacons sent from the WLAN module.
Green	flashing inversely	Number of flashes = number of connected WLAN stations and P2P radio lines, then there is a break.
Green	blinking	DFS scanning or another scan procedure.
Green	flickering	TX data traffic.
Red	flickering	Error in WLAN (TX error, e.g. transmission error due to bad connection).
Red	blinking	Hardware error detected in WLAN module.

Port Status - Ethernet Port

These LEDs display port-related information.

LS/DA (green/yellow LED)		Data, link status Status of the LAN interfaces
Off		No network device connected
Green	on continuously	Ethernet connection active
Yellow	flickering	Data traffic

2.18 Operation element (reset button)

In the BAT family devices, the operating elements include a reset button.

2.18.1 Functions

The reset button has two different functions, which are triggered by pressing the button for different lengths of time:

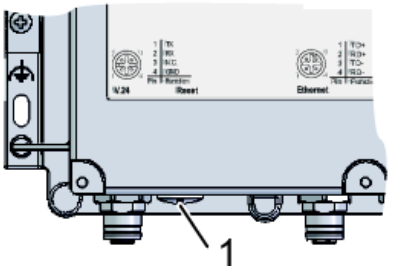
- **Resetting the configuration** (hard reset) – the button is pressed for more than 5 seconds but less than 10 seconds. All LEDs on the device light up continuously. When the reset button is released, the device restarts with the factory settings.
  The hard reset can be used, for example, if you have to reconfigure the device independently of any existing settings, or if no connection to the device configuration can be made.

Warning!
Save the current configuration of the device before the reset. After a hard reset, the device restarts with the factory settings based on the firmware used, and all the settings are lost.

- **Device restart** (soft reset) – the button is pressed for less than 5 seconds or more than 10 seconds. The device restarts.

2.18.2 BAT-F

In the BAT-F, the reset button (see (1) in the following figure) can be accessed from outside via a locking screw.
On delivery, the reset button is closed off with a screwable cover cap (protection class IP67).



☐ When you want to use the reset button, remove the cover cap.

Note: After pressing the reset button, replace the cover cap. Protection class IP67 is only achieved when the cover cap is closed.

2.18.3 BAT-Rail

In the BAT-Rail, the reset button (see (1) in the following figure) is located on the front plate of the device.

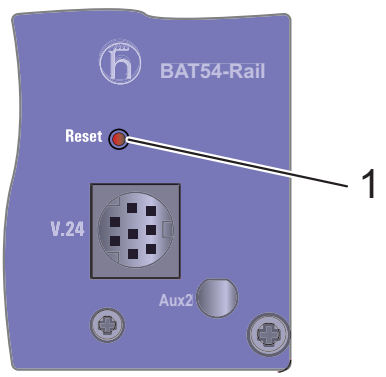


Figure 21: Reset button on BAT-Rail

2.19 Basic set-up

Information on the basic settings of the device can be found in the ”ConneXium WiFi TCSG,TSCN Configuration and Administration Guide” on the CD ROM.

- **Default settings**
  You will find information on the delivery state of the device in the "Dual-Band Industrial Access Point / Client / Access Bridge BAT54-Rail" user manual.

V.24 interface (external management)

At the V.24 connection, a serial interface is provided for the local connection of an external management station (VT100 terminal or PC with corresponding terminal emulation) or an AutoConfiguration Adapter ACA 11. This enables you to set up a connection to the Command Line Interface (CLI) and to the system monitor.

Caution!
Available as an accessory for certain Hirschmann devices, the AutoConfiguration Adapter ACA21-M12 is not designed to be used with BAT-F devices.
If you do not adhere to this warning, the ACA21-M12 could be destroyed. Use the ACA11-M12 if you want to use an AutoConfiguration Adapter for your BAT-F.

VT 100 terminal settings	
Data	8 bit
Stopbit	1 bit
Handshake	off
Parity	none

The connector is a 4-pin M12 female connector with A coding.
On delivery, the connector is sealed with a cover cap.
The housing of the M12 socket and the signal connectors are electrically connected to the functional ground (FE) (⏚) and to the metal housing of the device.

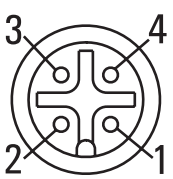
Figure	Pin	Function	
	1	TX	Transmit data
	2	RX	Receive data
	3	N.C.	Not connected
	4	GND	Ground

Table 9: Pin assignment of the V.24 interface for BAT-F (M12 socket)

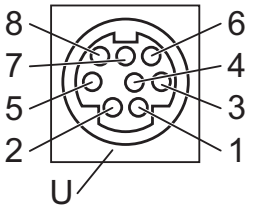
Figure	Pin	Function	
	1	CTS	Clear to send
	2	RTS	Request to send
	3	RxD	Receive data
	4	RI	Ring indicator
	5	TxD	Transmit data
	6	DSR	Dataset ready
	7	DCD	Data carrier detect
	8	DTR	Data terminal ready
	U	GND	Ground

Table 10: Pin assignment of the V.24 interface for BAT-Rail (miniDin socket)

Note: You will find the order number for the terminal cable, which is ordered separately, in the ”Technical Data” chapter (see on page 57 “Technical data“).

2.20 Disassembly

☐ To remove the device from the DIN rail, press the device downwards and pull it out from under the DIN rail.

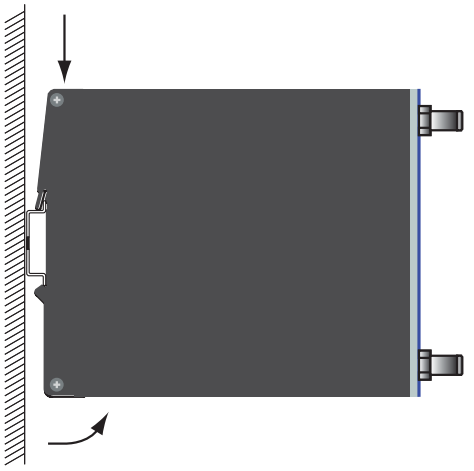


Figure 22: Removal from the DIN rail

3 Technical data

General technical data

Description	BAT54 types	Dual-band industrial WLAN access point/client in accordance with IEEE 802.11a/b/g/h and IEEE 802.11i
	BAT300 types	Dual-band industrial high-performance WLAN access point/ client in accordance with IEEE 802.11a/b/g/h and 802.11n
	BAT-Rail types	Used on DIN rail, 5-way (4-way for BAT-Client types) redundant voltage supply, vibration-resistant metal housing
	BAT-F types	Mounted on pole or flat surface (wall), protection class IP67, especially for use in field and in environments with the danger of explosion
Port type and number	BAT54-F	2 x WLAN interfaces, up to 8 SSIDs per WLAN interface, 1 x LAN port 10/100BASE-TX, Autosensing
	BAT54-F Single	1 x WLAN interface, up to 8 SSIDs per WLAN interface, 2 x LAN ports 10/100BASE-TX, Autosensing
	BAT54-F Client	1 x WLAN interface, 1 x LAN port 10/100BASE-TX, Autosensing
	BAT300-F	1 x WLAN interface, up to 8 SSIDs per WLAN interface, 1 x LAN port 10/100BASE-TX, Autosensing
	BAT54-Rail	2 x WLAN interfaces, up to 8 SSIDs per WLAN interface, 2 x LAN ports 10/100BASE-TX, Autosensing
	BAT54-Rail Single	1 x WLAN interface, 1 x LAN port 10/100BASE-TX, Autosensing
	BAT54-Rail Client	1 x WLAN interface, 1 x LAN port 10/100BASE-TX, Autosensing
	BAT300-Rail	1 x WLAN interface, up to 8 SSIDs per WLAN interface, 2 x LAN ports 10/100BASE-TX, Autosensing

Dimensions W x H x D	BAT-F, BAT-F FCC BAT-F X2, BAT-F X2 FCC BAT-Rail	261 mm x 56 mm x 212 mm 273 mm x 59 mm x 310 mm 85 mm x 105 mm x 135 mm
Weight	BAT-F, BAT-F FCC BAT-F X2, BAT-F X2 FCC BAT-Rail	approx. 2000 g approx. 5200 g approx. 770 g
Mounting	BAT-F BAT-Rail	Wall and pole mounting DIN rail and wall mounting

Power supply Operating voltage	BAT-F (excl. BAT54-F Single)	2 x 24 VDC -20% to + 25% at 5-pin “Power” plug
	BAT-F	Power over Ethernet acc. to IEEE 802.3af, Mode A, Class 0: + 36 VDC to 57 VDC / max. 8.2 W at “Ethernet” socket All power supplies redundant with each other
	BAT-Rail	2 x 24 V DC; 12 V DC 2 x (1 x for BAT-Client types) Power over Ethernet acc. to IEEE 802.3af All power supplies redundant with each other
Overload current protection at input		Non-replaceable fuse

Insulation voltage between operating voltage connectors and housing		800 V DC Protective elements limit the insulation voltage to 45 V DC.
Environment	Storage temperature (ambient air temperature)	-30 °C to +70 °C (-22 °F to +158 °F)
	Humidity	10% to 95% (non-condensing)
	Atmospheric pressure	up to 2,000 m (795 hPa)
Operating temperature	BAT54/300-Rail	Surrounding air -30 °C to +50 °C
	BAT54/300-F(except BAT300-F X2)	Ambient air -30 °C to +55 °C (temporarily up to +70 °C acc. to EN50155)
	BAT300-F X2	Surrounding air -20 °C to +55 °C
Pollution degree	BAT-Rail	2
Protection class		Sturdy metal housing
	BAT-F: IP67	- designed for mounting on a pole or on a flat surface (e.g. wall)
	BAT-Rail: IP40	- designed for mounting on a DIN rail or on a flat surface (e.g. wall)

Radio technology

Antenna connection	BAT54-F	Four antenna connections
	BAT54-F Single	Two antenna connections
	BAT54-F Client	Two antenna connections
	BAT300-F	Three antenna connections
	BAT54-Rail	Four Reverse SMA antenna connections (sockets)
	BAT54-Rail Single	Two Reverse SMA antenna connections (sockets)
	BAT54-Rail Client	Two Reverse SMA antenna connections (sockets)
	BAT300-Rail	Three Reverse SMA antenna connections (sockets)
Range	BAT...	Up to 20 km with external antennas (depending on antenna used, frequency range and data rate)
Encryption	BAT...	IEEE 802.11i/WPA2 with passphrase or 802.1x and hardware-accelerated AES, user authentication with 802.1x/EAP or LEPS, IEEE 802.1x supplicant in client mode, WPA/TKIP, WEP, access control lists, WLAN port and protocol filters, RADIUS client and server, built-in firewall with QoS, port filter, protocol filter, IDS and DoS protection, PMK caching and pre-authentication for fast roaming with IEEE 802.1x
Frequency range	BAT54	2 x (1 x for BAT-Client and BAT-Single types) independent radio modules, each 2.4 Ghz and 5 GHz: 2400-2483.5 MHz (ISM) and 5170-5810 MHz
	BAT300	1 x radio module, supported by 2.4 GHz and 5 GHz: 2400-2483.5 MHz (ISM) and 5170-5850 MHz
	BAT...BG(N)	Supports 2.4 GHz: 2400-2483.5 MHz (ISM)
Modulation technology	BAT...	22M0F7D (DSSS/OFDM) at 2.4 GHz 20M0G7D (OFDM) at 5 GHz
Radio topology	BAT...	WLAN access point, bridge, router, point-to-point, client, client-bridge mode, fixed mesh with RSTP
	BAT Client	WLAN client, client-bridge mode

Roaming	BAT...	Seamless handover, IAPP support, IEEE 802.11d support, background scanning for rogue AP detection and fast roaming
Transmission power	BAT54 (except for BG/ BGN types)	2.4 GHz 802.11b: +19 dBm @1 and 2 Mbit/s, +19 dBm @ 5.5 and 11 Mbit/s, 2.4 GHz 802.11g: +19 dBm @ 6 Mbit/s, +14 dBm @ 54 Mbit/s, 5 GHz 802.11a/h:+18 dBm @ 6 Mbit/s, +12 dBm @ 54 Mbit/ s with TPC and DFS, transmission power reduction in 1 dB steps to minimum 0.5 dBm
	BAT300 (except for BG/ BGN types)	max. 2.4 GHz 802.11b: +19 dBm @ 1 and 2 MBit/s, +19 dBm @ 5.5 and 11 MBit/s (power output at antenna input); max. 2.4 GHz power output at antenna input 802.11g: +18 dBm @ 6 to 36 MBit/s, +17 dBm @ 48 MBit/s, +16 dBm @ 54 MBit/s; 802.11n: +19 dBm @ 6.5/13 MBit/s (MCS0/8, 20 MHz), +10 dBm @ 65/130 MBit/s (MCS7/15, 20 MHz), +17 dBm @ 15/30 MBit/ s (MCS0/8, 40 MHz), +10 dBm @ 150/ 300 MBit/s (MCS7/15, 40 MHz); max. 5 GHz power output at antenna input 802.11a/h: +18 dBm @ 6 to 24 MBit/s, +17 dBm @ 36 MBit/s, +16 dBm @ 48 MBit/s, +15 dBm @ 54 MBit/s; 802.11n: +18 dBm @ 6.5/ 13 MBit/s (MCS0/8, 20 MHz), +10 dBm @ 65/130 MBit/s (MCS7/15, 20 MHz), +17 dBm @ 15/30 MBit/s (MCS0/8, 40 MHz), +10 dBm @ 150/300 MBit/s (MCS7/15, 40 MHz); min. transmission power reduction via software in 1 dB steps to min. 0.5 dBm
	BAT54 BG/BGN	2.4 GHz 802.11b: +19 dBm @1 and 2 Mbit/s, +19 dBm @ 5.5 and 11 Mbit/s, 2.4 GHz 802.11g: +19 dBm @ 6 Mbit/s, +14 dBm @ 54 Mbit/s
	BAT300 BG/BGN	max. 2.4 GHz 802.11b: +19 dBm @ 1 and 2 MBit/s, +19 dBm @ 5.5 and 11 MBit/s (power output at antenna input); max. 2.4 GHz power output at antenna input 802.11g: +18 dBm @ 6 to 36 MBit/s, +17 dBm @ 48 MBit/s, +16 dBm @ 54 MBit/s; 802.11n: +19 dBm @ 6.5/13 MBit/s (MCS0/8, 20 MHz), +10 dBm @ 65/130 MBit/s (MCS7/15, 20 MHz), +17 dBm @ 15/30 MBit/ s (MCS0/8, 40 MHz), +10 dBm @ 150/ 300 MBit/s (MCS7/15, 40 MHz)

EMC

EMC interference immunity		
EN 61000-4-2	Electrostatic discharge	
	Contact discharge: test level 3	6 kV
	Air discharge: test level 3	8 kV
EN 61000-4-3	Electromagnetic field, test level 3	
	- 80 - 2000 MHz	10 V/m
	- 2000 MHz - 2700 MHz	3 V/m
EN 61000-4-4	Fast transients (burst), test level 3	
	- Power line	2 kV
	- Data line	1 kV

EMC interference immunity		
EN 61000-4-5	Voltage surges - Power line, line/line: test level 2 - Power line, line/earth: test level 3 - Data line: test level 3	 0,5 kV 1 kV 1 kV
EN 61000-4-6	Conducted interference voltages, test level 3 150 kHz - 80 MHz	 10 V
EMC emitted interference		
EN 55022	Class B	
FCC 47 CFR Part 15	Class B	

Stability

Stability	
Vibration	IEC 60068-2-6 Test FC test level according to IEC 61131-2
	IEC 60068-2-64 test level in accordance with EN 50155
Shock	IEC 60068-2-27 Test Ea test level in accordance with IEC 61131-2, EN 50155
Shock resistance BAT54-F X2 and BAT54-F X2 FCC	IEC 60079-0 Shock resistance test with 1kg mass dropped from 0.7 m Housing cover only removeable with tool

Radio standards

EN 300 328	Electromagnetic compatibility and radio spectrum matters (ERM) - bandwidth transfer systems - data transmission equipment operating in 2.4 GHz ISM band and using spread spectrum modulation technology
EN 301 893	Broadband radio access networks (BRAN) - 5 GHz high-performance Remote Local Area Network (RLAN)
EN 301 489-1	Electromagnetic compatibility for radio equipment and services
EN 301 489-17	Electromagnetic compatibility (EMC) for radio equipment and services - specific conditions for 2.4 GHz wideband transmission systems and 5 GHz high-performance RLAN equipment

Network range

TP port	
Length of a twisted pair segment	typ. 100 m (cat5e cable with 100BASE-TX)

Table 11: TP port 10BASE-T / 100BASE-TX

Power consumption/power output and order numbers

Device	Power consumption	Power output	Order number
BAT54-F	10.0 W	34.1 Btu (IT)/h	943 959-112
BAT54-F FCC	10.0 W	34.1 Btu (IT)/h	943 959-012
BAT54-F X2	10.0 W	34.1 Btu (IT)/h	943 959-102
BAT54-F X2 FCC	10.0 W	34.1 Btu (IT)/h	943 959-002
BAT54-F Client	10.0 W	34.1 Btu (IT)/h	943 959-117
BAT54-F Client FCC	10.0 W	34.1 Btu (IT)/h	943 959-017
BAT54-F Single	10.0 W	34.1 Btu (IT)/h	943 959-116
BAT54-F Single FCC	10.0 W	34.1 Btu (IT)/h	943 959-016
BAT54-Rail	10.0 W	34.1 Btu (IT)/h	943 926-021
BAT54-Rail - FCC	10.0 W	34.1 Btu (IT)/h	943 926-022
BAT54-Rail - Japan	10.0 W	34.1 Btu (IT)/h	943 926-023
BAT54-Rail Client	10.0 W	34.1 Btu (IT)/h	943 926-521
BAT54-Rail Client (FCC)	10.0 W	34.1 Btu (IT)/h	943 926-522
BAT300-Rail	10.0 W	34.1 Btu (IT)/h	943 989-001
BAT300-Rail FCC	10.0 W	34.1 Btu (IT)/h	943 989-101
BAT300-F	10.0 W	34.1 Btu (IT)/h	943 959-118
BAT300-F FCC	10.0 W	34.1 Btu (IT)/h	943 959-018
BAT300-Rail BGN	10.0 W	34.1 Btu (IT)/h	943 989-105
BAT300-F BGN	10.0 W	34.1 Btu (IT)/h	943 959-218
BAT54-F Client BG	10.0 W	34.1 Btu (IT)/h	943 959-217
BAT54-F Single BG	10.0 W	34.1 Btu (IT)/h	943 959-216
BAT54-F BG	10.0 W	34.1 Btu (IT)/h	943 959-212
BAT54-F X2 BG	10.0 W	34.1 Btu (IT)/h	943 959-202
BAT54-Rail Client BG	10.0 W	34.1 Btu (IT)/h	943 926-205
BAT54-Rail BG	10.0 W	34.1 Btu (IT)/h	943 926-105
BAT54-Rail Single	10,0 W	34.1 Btu (IT)/h	943 926-721
BAT54-Rail Single (FCC)	10,0 W	34.1 Btu (IT)/h	943 926-722
BAT54-Rail Single BG	10,0 W	34.1 Btu (IT)/h	943 926-305
BAT300-F X2	10,0 W	34.1 Btu (IT)/h	943 959-108
BAT300-F X2 BGN	10,0 W	34.1 Btu (IT)/h	943 959-208

Scope of delivery

Device	Scope of delivery
	Device Installation user manual in German and English CD ROM with following content: - Management software LANconfig - Monitoring software LANmonitor and WLANmonitor - Installation user manual in PDF format in German/English - User manual in PDF format in German/English - Reference manual in PDF format in German/English - HiLCOS operating system as upx file 50 Ohm connection
BAT-F additionally	Adapter cable for serial interface, M12, 4-pin, plug -> SubD 9, socket M12 plug shielded for Ethernet interface M12 plug unshielded for power supply connection
BAT-Rail additionally	Adapter cable for serial interface, miniDin, socket -> SubD 9, socket Two 3 dBi dipole dual-band antennas DIN rail mounting material
BAT300 additionally	Three 3 dBi dipole dual-band antennas DIN rail mounting material

Accessories

Name		Order number
ACA11-M12	AutoConfiguration Adapter for M12 connection	943 972-001
ACA11 miniDin	AutoConfiguration Adapter for miniDin connection	943 973-001
RPS 30	Rail Power Supply	943 662-003
RPS 80 EEC	Rail Power Supply	943 662-080
RPS 120 EEC	Rail Power Supply	943 662-120
RPS60/48V EEC	Rail Power Supply for Power over Ethernet	943 952-001
HiVision	Network Management software	943 471-100
BAT-F pole mounting set	Set for fastening BAT-F device to pole, maximum permitted wind load 220 km/h, permitted pole diameter 39 mm to 60 mm	943 966-001
Adapters		
BAT Protector f-m	Lightening protection adapter f-m	943 903-373
Octopus terminal cable	Adapter cable for serial interface, M12, 4-pin, plug -> SubD 9, socket	943 902-001

Name	Order number
Rail Power Supply RPS 30	943 662-003
Rail Power Supply RPS 80 EEC	943 662-080
Rail Power Supply RPS 120 EEC	943 662-120
Industrial HiVision Network Management software	943 156-xxx

Note: Products recommended as accessories may have characteristics that do not fully correspond to those of the corresponding product. This may limit their possible usage in the overall system.

Underlying norms and standards

Name	
72/245/EWG, 2006/28/EG	Directive on radio interference (electromagnetic tolerance) for motor vehicles. Certified devices are marked with an e1 type approval indicator.
EN 50155:2007	Railway applications - electronic systems in railway vehicles
EN 55022:2006 + A1:2007	IT equipment – radio interference characteristics
EN 60079-15	Electrical equipment for explosive gas atmospheres – part 15: Construction, testing and marking of protection type "n" electrical apparatus.
EN 61000-6-2:2005	Generic norm – immunity in industrial environments
EN 61131-2:2003	Programmable logic controllers
FCC 47 CFR Part 15:2009	Code of Federal Regulations
IEC/EN 60950-1:2006	Safety for the installation of IT equipment
IEEE 802.3af	Power over Ethernet
IEEE 802.1 D	Switching, GARP, GMRP, Spanning Tree
IEEE 802.1 D-1998	Media access control (MAC) bridges (includes IEEE 802.1p Priority and Dynamic Multicast Filtering, GARP, GMRP)
IEEE 802.1 Q	Tagging
IEEE 802.1 Q-1998	Virtual Bridged Local Area Networks (VLAN Tagging, GVRP)
IEEE 802.1 w.2001	Rapid Reconfiguration
IEEE 802.3-2002	Ethernet
IEEE 802.11a/b/g/h/i/n	WLAN

Table 12: List of norms and standards.
Certified devices are marked with a certification indicator.

The device has a certification based on a specific standard only if the certification indicator appears on the housing.
However, with the exception of Germanischer Lloyd, ship certifications as well as RINA certifications are only included in the product information under www.beldensolutions.com.

A Further Support

Technical Questions and Training Courses

In the event of technical queries, please contact your local Hirschmann distributor or Hirschmann office.
You can find the addresses of our distributors on the Internet: www.beldensolutions.com.

Our support line is also at your disposal:

- Tel. +49 1805 14-1538
- Fax +49 7127 14-1551

Answers to Frequently Asked Questions can be found on the Hirschmann internet site (www.beldensolutions.com) at the end of the product sites in the FAQ category.
The current training courses to technology and products can be found under http://www.hicomcenter.com.

Hirschmann Competence Center

In the long term, excellent products alone do not guarantee a successful customer relationship. Only comprehensive service makes a difference worldwide. In the current global competition scenario, the Hirschmann Competence Center is ahead of its competitors on three counts with its complete range of innovative services:

- Consulting incorporates comprehensive technical advice, from system evaluation through network planning to project planing.
- Training offers you an introduction to the basics, product briefing and user training with certification.
- Support ranges from the first installation through the standby service to maintenance concepts.

With the Hirschmann Competence Center, you have decided against making any compromises. Our client-customized package leaves you free to choose the service components you want to use.
Internet:
http://www.hicomcenter.com.

HIRSCHMANN

A BELDEN BRAND